Heating Piping & Air Conditioning

INDUSTRIAL • COMMERCIAL • INSTITUTIONAL • PUBLIC BUILDINGS

Page 183—Journal Section of The American Society of Heating and Ventilating Engineers

January 1954

DIRECTORY NUMBER

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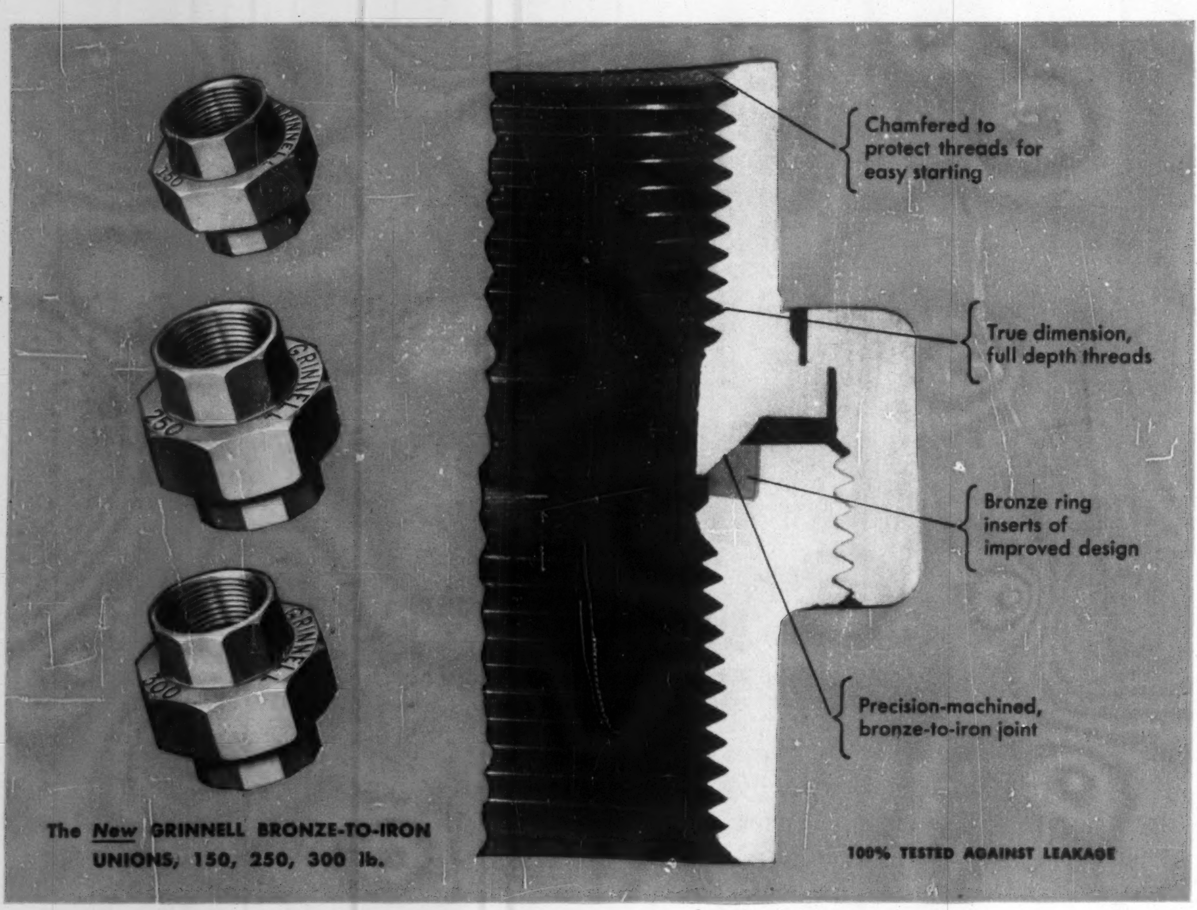

Chamfered to protect threads for easy starting
True dimension, full depth threads
Bronze ring inserts of improved design
Precision-machined, bronze-to-iron joint

The *New* GRINNELL BRONZE-TO-IRON UNIONS, 150, 250, 300 lb.

100% TESTED AGAINST LEAKAGE

Here's the inside story behind the *new* GRINNELL UNIONS

Cut-away view of the *new* Grinnell bronze-to-iron union reproduced here is *exactly as photographed*. It has not been retouched in *any* way.

The "inside story", as told by the camera, points up the engineering achievement that makes the *new* Grinnell bronze-to-iron union a standard of comparison for the industry.

What the camera cannot show you is the Quality Control which goes into the *new* Grinnell Unions. For instance: each union is tested against leakage by applying air pressure under liquid.

High quality materials, completely new, modern manufacturing machinery, and highly skilled personnel are employed in the manufacture of the *new* Grinnell unions. Branch warehouses and distributors, from coast to coast, make local stocks as convenient as your telephone.

Features of the *new* Grinnell bronze-to-iron unions:

- Precision-machined, bronze-to-iron joint for a positive, leak-proof connection
- 100% tested with air under liquid
- Bronze ring inserts of improved design — bonded to iron by newly developed equipment
- True dimension, full depth threads
- Chamfered to protect threads for easy starting
- Designed for rugged service

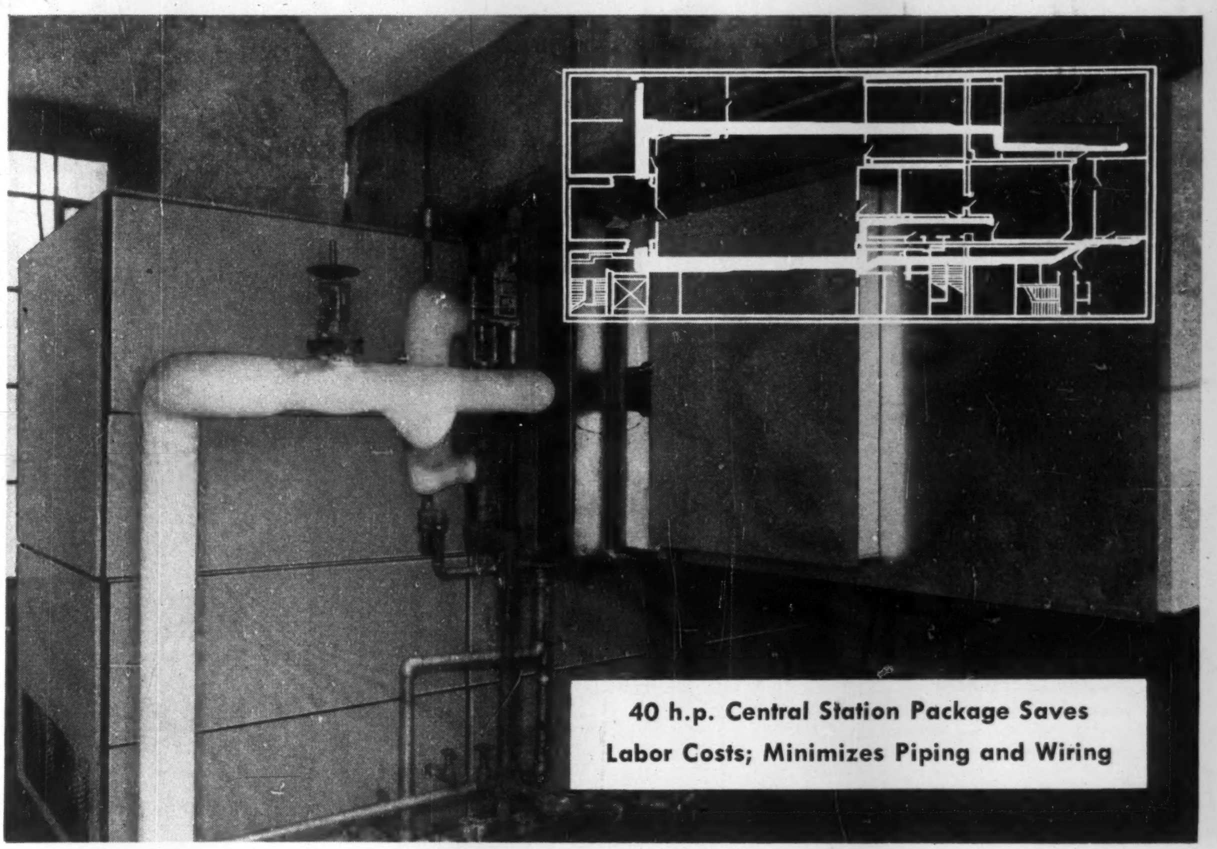
GRINNELL

WHENEVER PIPING IS INVOLVED

Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

Manufacturer of: pipe fittings • welding fittings • forged steel flanges • steel nipples • engineered pipe hangers and supports Thermolier unit heaters • Grinnell-Saunders diaphragm valves • prefabricated piping • Grinnell automatic fire protection systems

usAIRco RK Cools and Heats TWA Ticket Office, St. Louis



40 h.p. Central Station Package Saves Labor Costs; Minimizes Piping and Wiring

The initial plans for air conditioning the TWA Ticket Office called for a split system, using separate coil section, compressor and evaporative condenser. However, when bids on this type of installation came in, they ran considerably higher than estimated costs and the allocation designated for air conditioning.

To overcome this prohibitive cost, a usAIRco RK (Refrigerated Kooler-aire, 40 h.p.) was installed. The RK-40 combines air conditioner, compressor and evaporative condenser in one compact operating unit, eliminating the need for an expensive built-up system. The RK is delivered ready for installation, with only three simple connections required: to ducts, water supply and drain and power supply. A large equipment room with existing ductwork, located back of the TWA office, proved the ideal location for the RK. Not only was a saving effected on labor and assembly time because of the RK's ease of installation, but piping and wiring costs were also held to the barest minimum because needed equipment was all in one room.

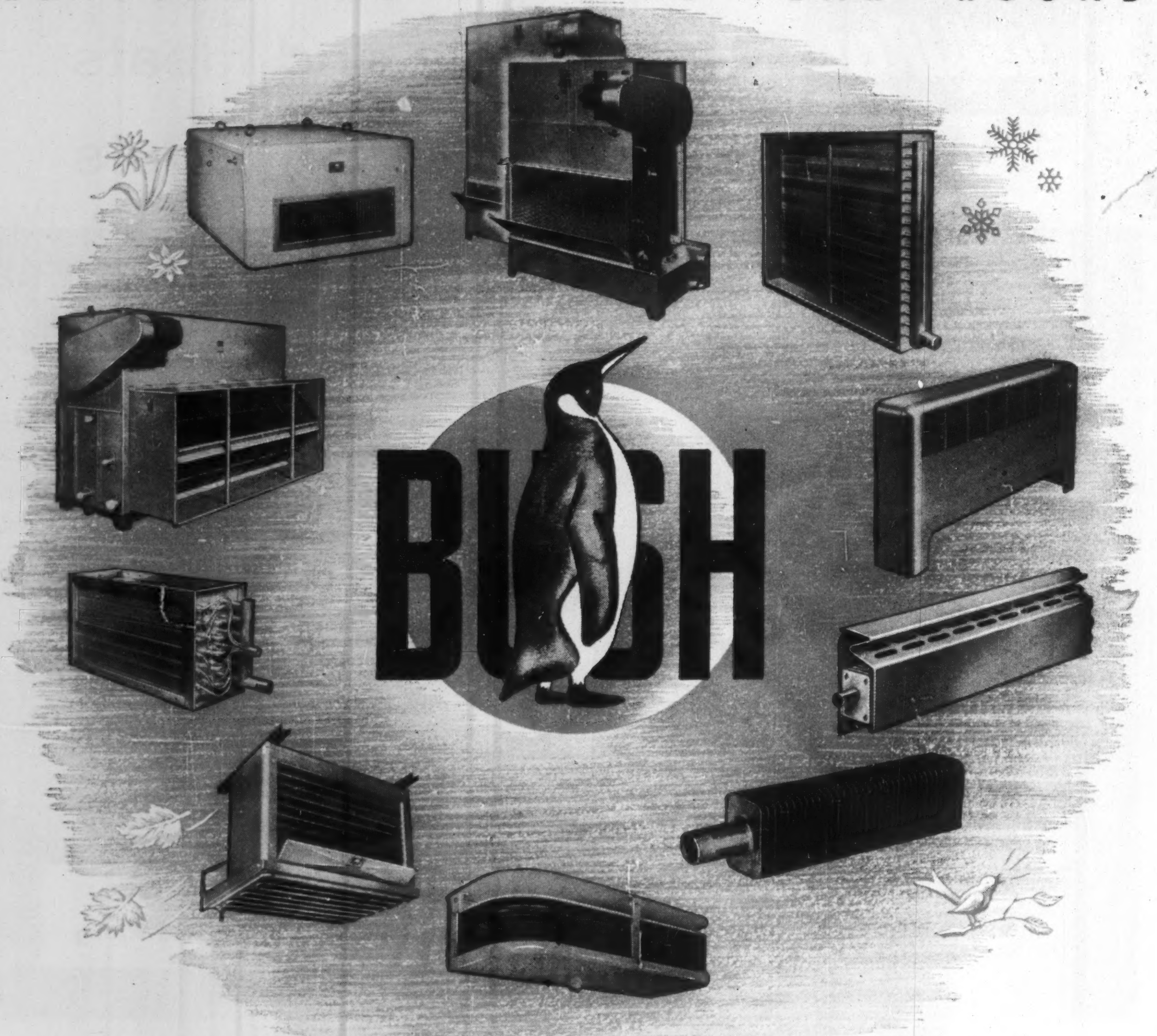
For cooling, 25, 50 and 75% capacity reduction takes care of varying loads. This is important, as the TWA office is open 24 hours a day, never closes. Heating is by usAIRco's 2-row steam coil. Installation contractor: Enterprise Heating & Air Conditioning Co., St. Louis. Engineering design by L. Betsworth, TWA mechanical engineer.

For Descriptive Literature on RK's, Write Dept. HP 14

UNITED STATES AIR CONDITIONING CORPORATION
MINNEAPOLIS 14; MINNESOTA

usAIRco
30 YEARS OF AIR CONDITIONING

LEADING THE WAY THE YEAR 'ROUND



BUSH ... THE YEAR 'ROUND LINE

Autumn, winter, spring and summer, there's a Bush unit to handle the heating or cooling requirements for product or comfort. Air Handling units and Comfort Conditioners to take the "dog" out of the summer days; Unit Coolers and Product Coolers, Evaporative Condensers and Cooling Towers for year 'round use; water and steam coils, convectors, finned pipe radiation and baseboard convectors offer a fall and winter line for industrial and domestic heating; condensers, special coils and other heat transfer products all combine to offer the smart businessman a year 'round profit line.

Investigate this opportunity now by contacting the nearest Bush Representative or write the factory direct.

Complete catalogs containing valuable engineering data and specifications available upon request.

Bush Manufacturing Company

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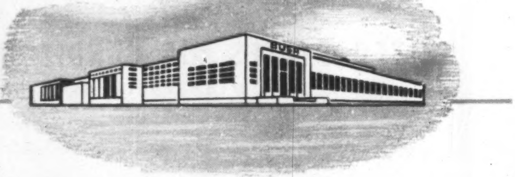

Heating Piping & Air Conditioning

Vol. 26 No. 1

(with which is merged the Aerologist)

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Better by FARR
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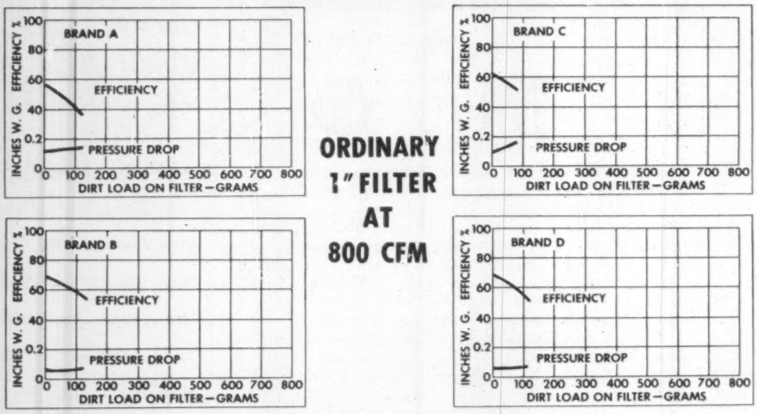
COMPARATIVE PERFORMANCE



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ALL CURVES BASED ON 20x20x1" FILTERS

first high velocity 1" filter

HOLDS 7 TIMES AS MUCH DIRT AS OTHER 1" FILTERS

Filters half-again as much clean air because of 50% greater capacity
Gives sustained efficient performance with low pressure loss
Can be used at either high or low velocity

Here at last is a scientifically designed, proven, ruggedly built, all metal, high velocity 1" filter. It is no longer necessary to make extensive never-ending replacements . . . or put up with poor performance as ordinary 1" filters approach the useless point.

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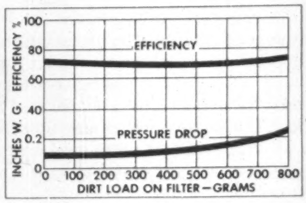
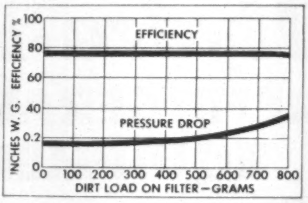
Eliminate the wasteful expense of inefficient filters—save time and trouble—get better air filtration at lower cost. Write today for complete information. Farr Company, P. O. Box 10187, Airport Station, Los Angeles 45.

NEW FAR-AIR 1" FILTER AT 800 CFM



NEW FAR-AIR 1" FILTER AT 1200 CFM



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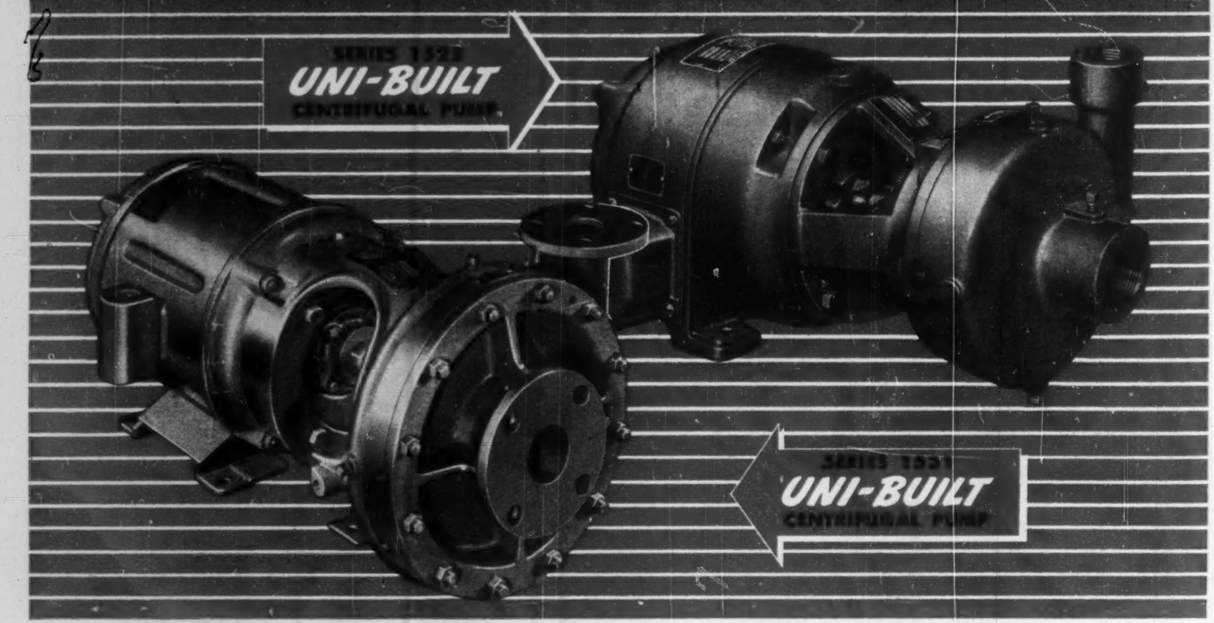

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Sizes, capacities and prices on B & G Series 1522 and 1531 Stock Pumps are given in a bulletin available upon request. Send today for your copy.

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Oversize bearings hold the shaft in alignment for smooth, quiet performance . . . balancing of the impeller prevents shaft vibration and seal failure. All parts are machined to rigid specifications, carefully inspected and assembled—assurance of minimum installation and maintenance expense. B & G Series 1522 and 1531 Pumps kept in stock at the factory are bronze-fitted only, but are available as all-iron, all-bronze or stainless steel units.

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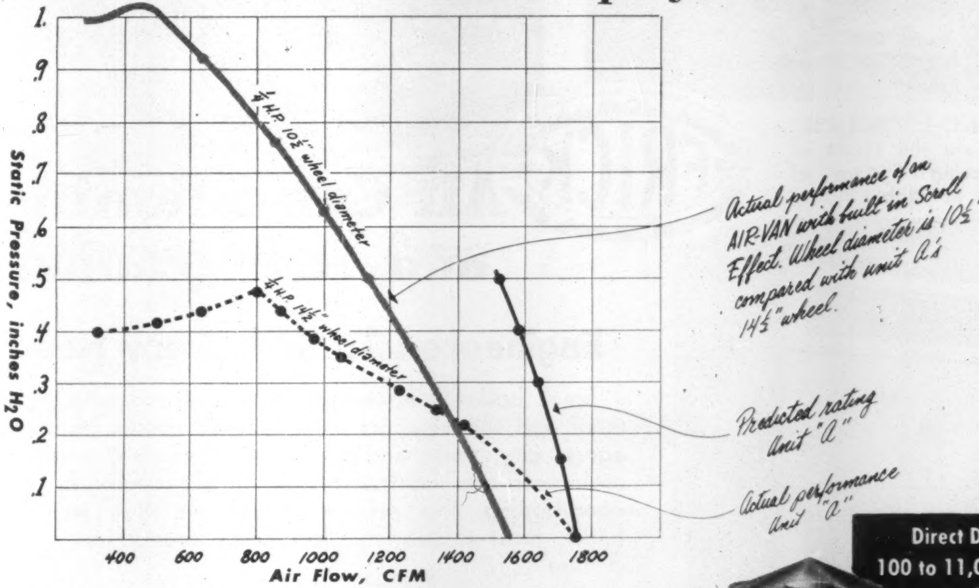
*Reg. U.S. Pat. Off.

Here's what we found out about power roof exhausters when rated in *actual physical tests*



The graph tells the story. When ratings are predicted from a formula, the theoretical performance curve does not hold up against an actual physical test. Results show that other uncalculated factors drastically alter air output. Gallaher Air-Vans which are based on design research, have exclusive, patented, built-in scroll effect. This research indicates that unless scroll effect is present, reasonably efficient performance against even ¼" static pressure is impossible.

Further studies show that you cannot even predict the performance of power roof exhausters when only slight modifications are made in design. Errors may be more than 50%. That's why Gallaher relies on actual physical tests, so that the buyer can be certain that when a unit is supposed to deliver a specified volume against a specified static pressure, you can be sure it will do so.

This exclusive feature plus many others — low silhouette, safe fume removal, heavy construction, direct connection, weatherproof design — is why engineers everywhere are turning to Gallaher to solve almost every kind of industrial ventilation problem. For full catalog information write

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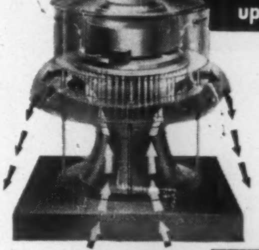
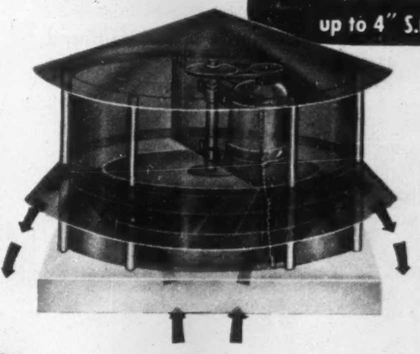
100 to 11,000 CFM
up to 4.2" S.P.



Patents 2188741 2526290.
Patents pending

NEW Belt Drive 4000
to 65,000 CFM
up to 4" S.P.



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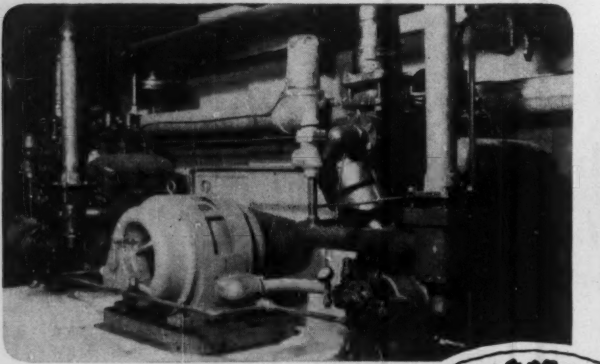

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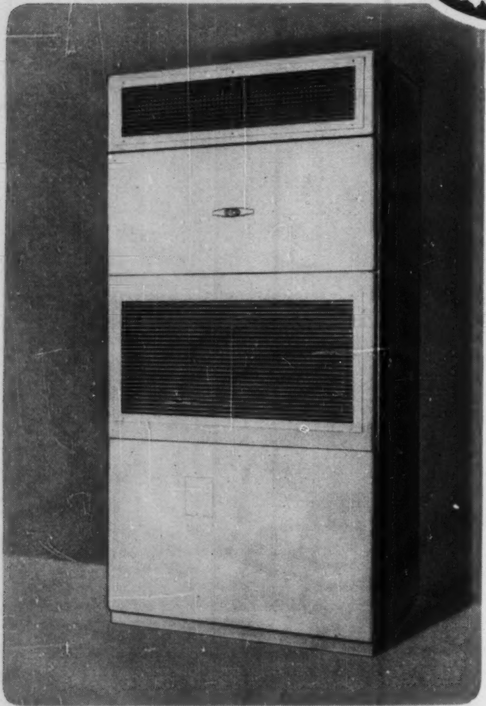
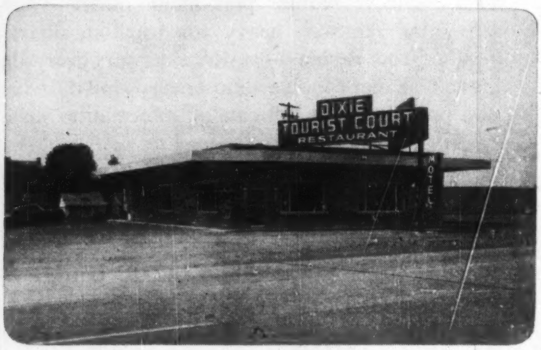


Frick Unit Air Conditioners are Manufactured in 3, 5, and 7½ Horsepower Sizes—Give More Cooling Per Dollar

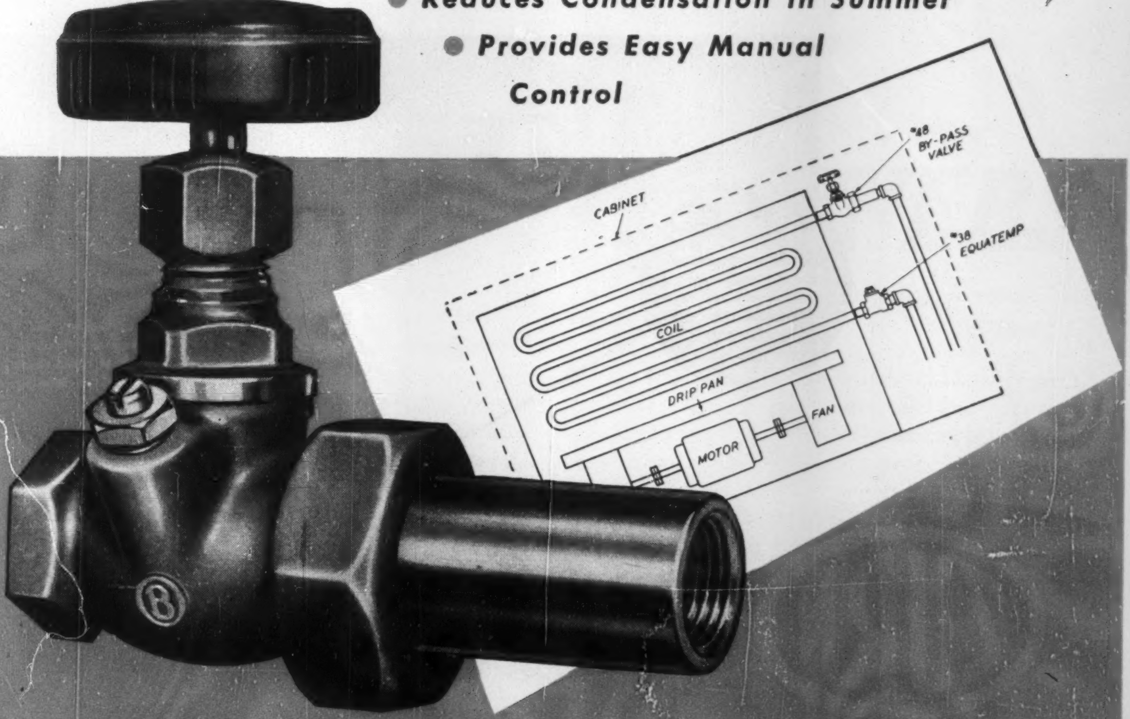
Shoe Stores, Drug Stores, Supermarkets, Shopping Centers, Department Stores Can All Increase Sales With Frick Year 'Round Air Conditioning

When the Owner of This Tourist Court Installed Air Conditioning, He Chose Frick—a Leader in the Field for Over Fifty Years



New O-B No. 48 By-Pass Valve

- **For Air Conditioning Units**
- **Prevents Freezing in Winter**
- **Reduces Condensation in Summer**
- **Provides Easy Manual Control**



This new valve is designed especially for use on room units of year-around air conditioning systems. Basically, it's a sturdy globe valve for manual control of room temperature. But probably the most important single feature is the by-pass. It remains open in winter, even with the valve closed, to allow enough circulation to prevent freezing. In summer the by-pass is closed so that no cold water can stand in the unit when it is shut off. This eliminates the danger of excess condensation.

Usual procedure is to install the No. 48 in combination with O-B Equatemp as shown in the line drawing. It can also be used separately from Equatemp®, the valve that both balances and shuts off. The combination of Equatemp and No. 48 valves offers complete temperature control, positive on-and-off regulation, balancing, and provisions for venting, draining and temperature readings. A union nut and tail piece comes with the No. 48 Valve. Send in the coupon below for a folder giving complete information.

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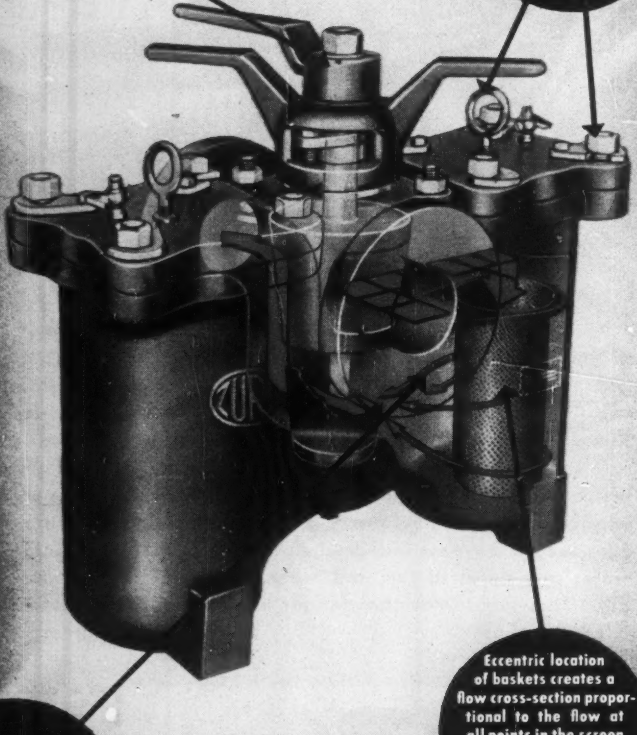
4377-V

You can maintain more of the

Zurn LPD Duplex Plug Type Strainers in common with other types provide continuous flow of liquids and are designed for suction or pressure installations. They are provided with an air-pressure relief valve to prevent air lock in chamber. Zurn Engineered LPD Strainers are designed to provide the answer to costly shut downs



Plug Relieving Yoke assures easy valve operation since the plug can be unseated before turning.

"C" washer and yoke cover closures facilitate rapid cover removal for cleaning.

Minimum open area ratio of 6 to 1 maintained even though selected basket material may be only 30% open.

Eccentric location of baskets creates a flow cross-section proportional to the flow at all points in the screen cavity, thus reducing turbulence and flow resistance at that critical point.

ZURN

engineered

LPD STRAINERS

Zurn LPD Strainers permit high rates of flow with *remarkably low pressure drop* and immeasurably improve the handling of fluids such as oil, chemicals, water through pipe lines.

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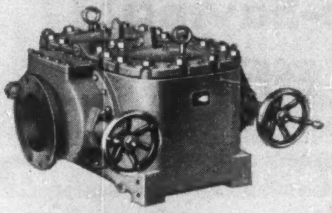
Full-Rated Pressure with . . .

ZURN Engineered LOW PRESSURE DROP STRAINERS

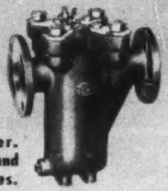
Zurn Low Pressure Drop (LPD) Strainers are design improved for correct circularity. They have ample waterways; smooth inner walls; correctly sized and perforated baskets, eccentrically positioned, all of which combine to reduce pressure loss and afford maximum protection for all types of mechanical units connected with pipe lines. Zurn LPD Strainers are held to close tolerances for materials, shapes, and dimensions, assuring the utmost in strength and safety and continuous operation.

Zurn LPD Strainers are widely used to protect close-tolerance control devices and delicate mechanisms, also to protect product purity. They make continuous production processes possible. Zurn Fluid Handling Engineers are available for consultation on your particular problem.

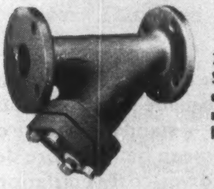
There is a ZURN LPD Strainer for every fluid handling purpose



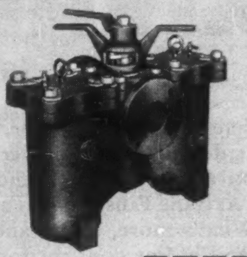
Zurn Duplex Gate Type Multi-Basket Strainer.



Zurn Sinlex Strainer. Available in offset and straight-through types.



Zurn "Y" Type Strainers available in any cast material and for high pressures.



Zurn Duplex Plug Type Strainer.

Zurn LPD Strainer applications include fluid handling lines for lubricating and fuel oil, and oil during the refining process; a wide range of chemicals produced and used by the various process industries; public utility power plants; power stations; industrial plants; ships and high temperature installations. Zurn Fluid Handling Engineers are available for consultation.

Pat. & Pat. Pending

J. A. ZURN MFG. CO.

INDUSTRIAL DIVISION • ERIE PA., U. S. A.

In Canada: Canadian Zurn Engineering Ltd., Montreal, 25, P. Q. Canada

Write for LPD Strainer Manual Data No. 952.

This manual includes previously unpublished pressure drop data and gives useful, factual information on fluid handling.

LPD strainers

J. A. ZURN MFG. CO.

Industrial Division, Erie, Pa., U. S. A.

Please send me Zurn LPD Strainer Manual Data No. 952.

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Position____________________

Company____________________

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City and State____________________

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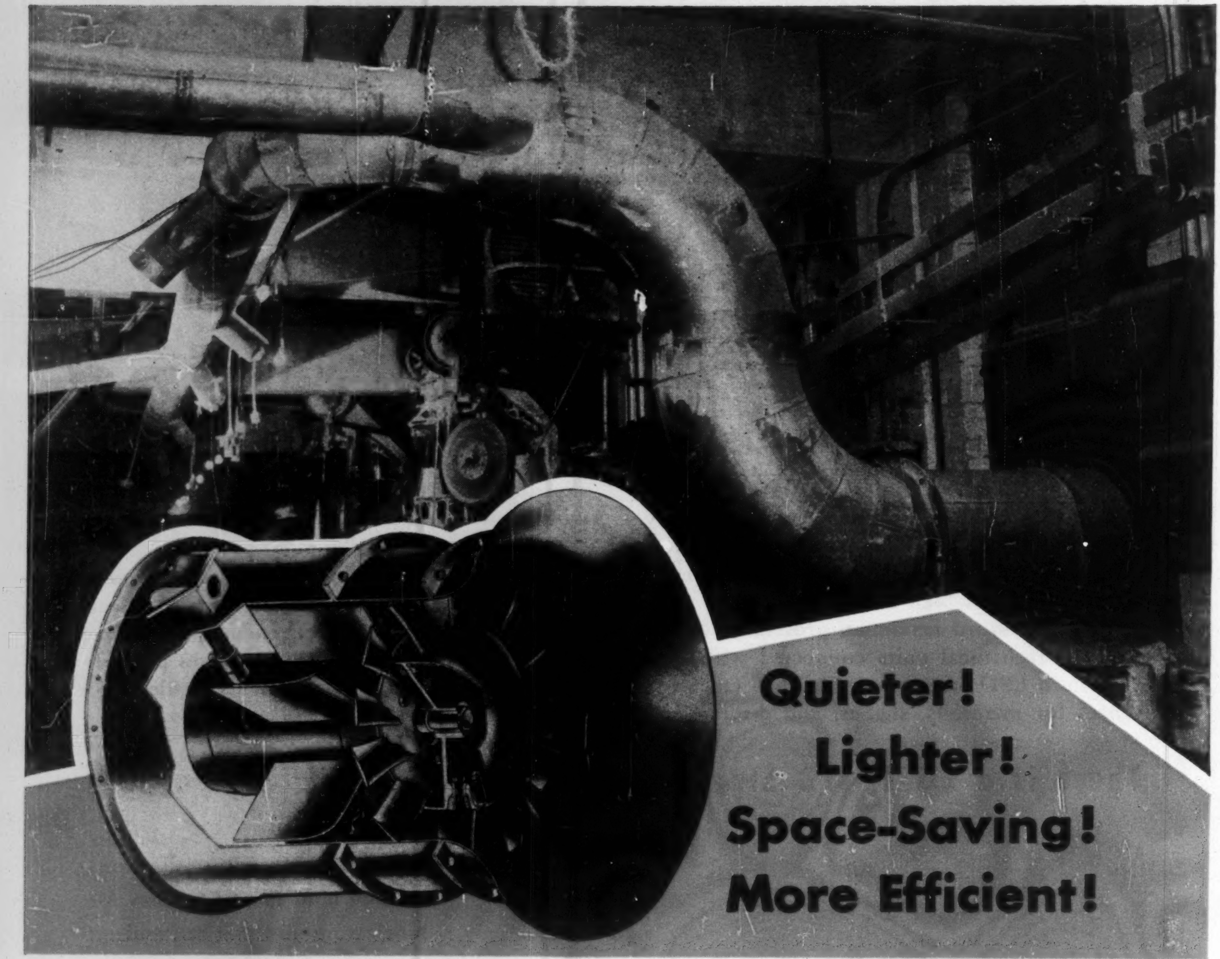


JOY AXIVANE* FANS

(SERIES 1000)

Write for Bulletin, or

Consult a Joy Engineer

The quieter operation, lighter, more compact design, lower power consumption and unmatched efficiency of JOY Axivane Fans are *real* advantages! What's more, their vaneaxial design and in-line construction permit mounting right in the air duct, making installation simple and saving greatly on time and cost. These features, plus the extreme flexibility of operating range made possible by adjustable blades—a standard feature of all JOY Fans—mean better, more dependable and lower-cost ventilation, no matter what your conditions are.

● Let JOY Axivane Fan specialists work with you for best results on your ventilation jobs.

**Reg. U. S. Pat. Off.*

W&D 12355

JOY MANUFACTURING COMPANY

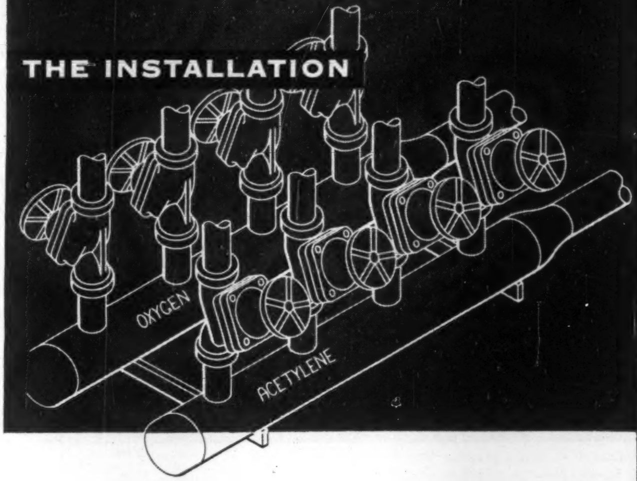
GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

This Valve Stops Hidden Losses

...in Welding Gas Systems, for instance

THE INSTALLATION



In a prominent New Orleans shipyard, with Crane Diaphragm valves listed as "standard operating procedure" for complete oxygen-acetylene system. Shown is typical installation on portable manifold.

VALVE SERVICE RATINGS

SUITABILITY:
100% effective – no leakage

FEATURES:
No seating stress on diaphragm

MAINTENANCE COST:
Zero

SERVICE LIFE:
Installed 2 yrs – long life indicated

OPERATING RESULT:
Big savings on welding gas costs

AVAILABILITY:
Crane Catalog item – No. 1652

THE CASE HISTORY

Costly loss of welding gases was traced to the conventional packed valves formerly used on the system. Leakage through the stuffing persisted despite frequent, regular servicing of stem packing on the valves. This high maintenance cost added to the yard's loss.

The remedy was found in Crane No. 1652 packless Diaphragm Valves, Underwriters approved for the service. These valves stopped the leakage, and not one Crane valve has needed attention since installed more than 2 years ago. Despite continued expansion, the yard's costs for welding gas have been sharply reduced.

THE VALVE

The modern packless valve with Neoprene diaphragm that serves only to seal the bonnet. Its independent disc saves diaphragm wear, provides positive seating on fluid, even should the diaphragm fail. Choose from a wide range of body and trim materials for all kinds of corrosive and ordinary services. Sizes ½ to 6 in.; screwed or flanged ends. See your Crane Catalog, or your Crane Representative.

CRANE
150 WOG

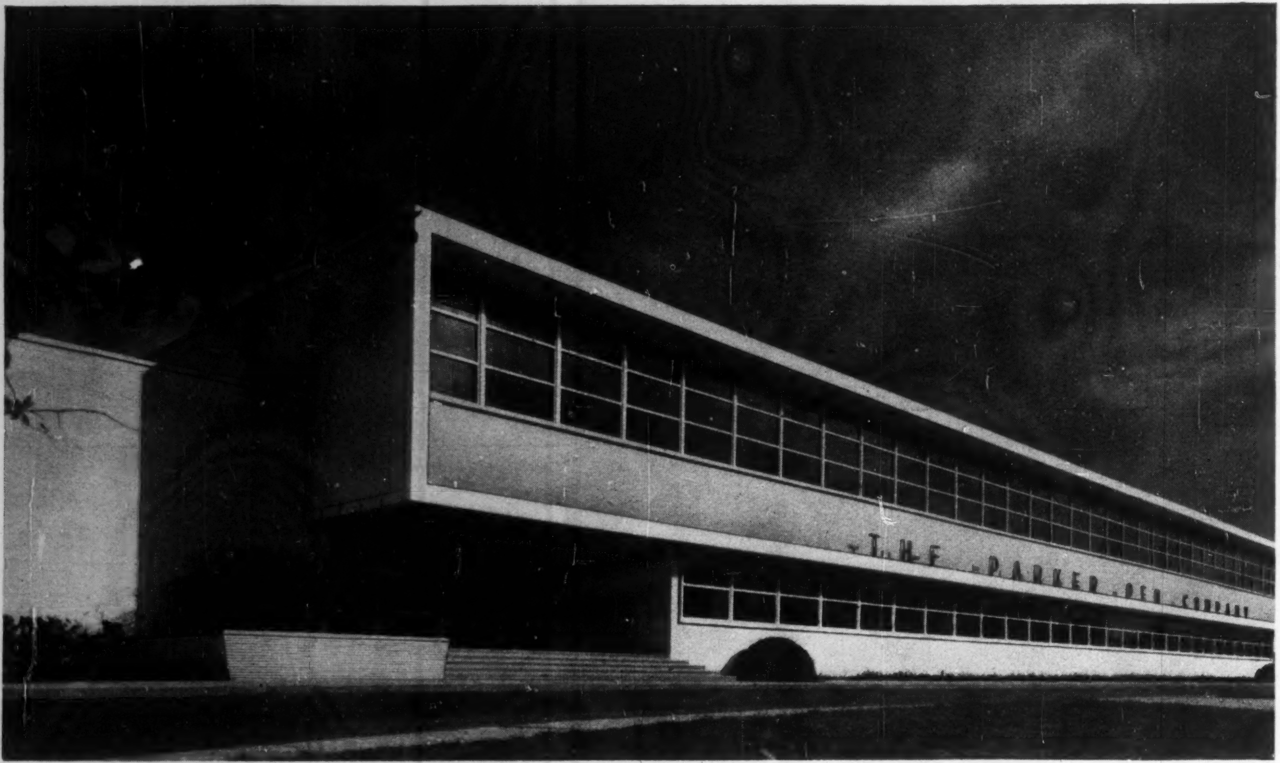
THE BETTER QUALITY...BIGGER VALUE LINE...IN BRASS, STEEL, IRON

CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

for the
THRIFTY BUYER

VALVES • FITTINGS • PIPE • PLUMBING • HEATING



The Parker Pen Company's new Arrow Park plant at Janesville, Wis. Architects: John J. Flad & Associates, Madison. Wis. Mechanical Engineers: Beling Engineering Consultants, Moline, Ill. Heating Contractors: Hyland Hall Co., Madison, Wis.

How Honeywell Customized Temperature Control can help you

Give your clients the "working climate" they've always wanted

Why Honeywell Customized Temperature Control is becoming a must for all types of buildings

"Working climate," as important to the success of your clients' business as black ink in the ledger, is made up of a lot of things.

The handling of personnel, proper lighting, vacations with pay, temperature and humidity control are a few of them.

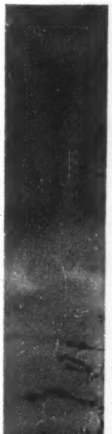
And the best way to provide proper temperature control is through use of *Honeywell Customized Temperature Control.*

The key word here is "customized." It means that whatever your clients' control requirements, a Honeywell Customized Temperature Control installation, *designed to fit the needs of the building and its occupants* is your answer. This applies not only to heating and cooling, ventilation and humidity control, but to industrial control as well.

Only Honeywell can provide true "customized" control. Because only Honeywell manufactures all three types of controls—pneumatic, electric and electronic—which often must be integrated in a single building to give you the right performance.

The story, in capsule form, of the Honeywell Customized Temperature Control installation in Parker Pen's new plant in Janesville, Wisconsin, is told by floor plan and picture captions opposite. They tell how specific occupancy, use and exposure problems were met—to provide an ideal "working climate."

The *techniques* used, applied to your particular problems and the problems of your clients, can help you give your clients even better performance by providing the "working climate" they've always wanted.

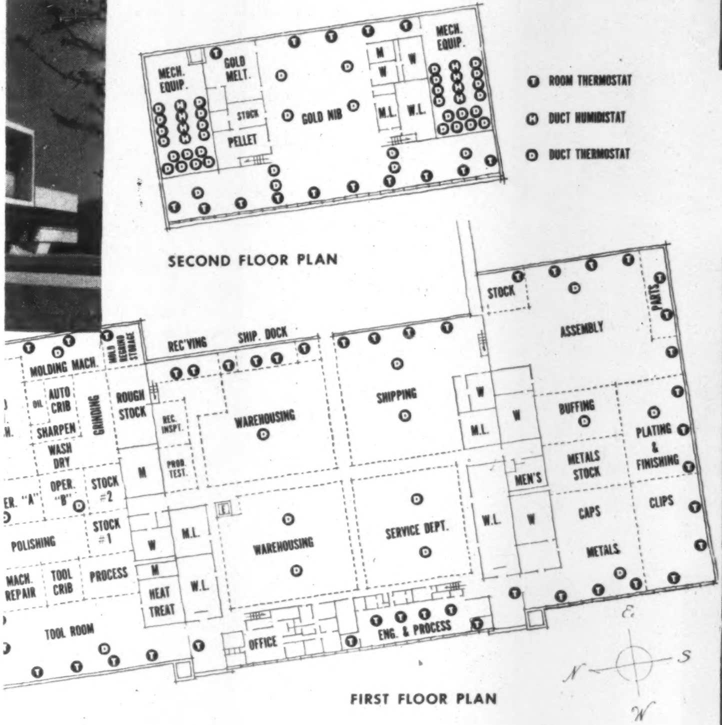


For comfortable, even temperature in new or existing buildings—of any size—use Honeywell Customized Temperature Control

Whether it's an office, motel, airport, hospital, apartment, church, school, factory, store, garage—or any size building—new or existing, Honeywell Customized Temperature Control can help meet your clients' heating, ventilating, air conditioning and industrial control problems.

Your clients will not only enjoy more comfort and efficiency, they'll save fuel, too.

For full facts on Customized Temperature Control, call your local Honeywell office. Or mail the coupon.


MECH. EQUIP.
GOLD MELT.
STOCK
PELLET
GOLD NIB
M.L.
W.L.
MECH. EQUIP.
T ROOM THERMOSTAT
H DUCT HUMIDISTAT
D DUCT THERMOSTAT
MOLDING MACH.
MOLD REGRIND STORAGE
REC'VING
SHIP. DOCK
AUTO CRIB
GRINDING
SHARPEN
WASH DRY
ROUGH STOCK
REC. INSPT.
PROD. TEST.
WAREHOUSING
SHIPPING
STOCK
ASSEMBLY
PARTS
BUFFING
METALS STOCK
PLATING & FINISHING
MEN'S
OPER. "A"
OPER. "B"
STOCK #2
STOCK #1
POLISHING
PROCESS
MACH. REPAIR
TOOL CRIB
HEAT TREAT
WAREHOUSING
SERVICE DEPT.
CAPS
CLIPS
METALS
TOOL ROOM
OFFICE
ENG. & PROCESS
N
S
E
W

SECOND FLOOR PLAN

FIRST FLOOR PLAN

Strategically located thermostats guard the comfort of workers in the large engineering and process room. Sunshine entering through the big windows could upset the comfort balance in summer as well as in winter—if Honeywell Customized Temperature Control weren't on the job controlling both heating *and* cooling.

"Working Climate" problems are different here. The room is huge; physically more active workers find their best room temperature is lower than in the engineering room. But Honeywell Customized Temperature Control—with thermostats strategically located in the area—easily handles this occupancy and use problem, at the same time compensating for different exposure problems.

Philip Hull, manufacturing vice-president, the Parker Pen Company, says

"When we planned our new Janesville plant we wanted it to be the best plant of its kind ever built. Certainly the ideal indoor climate Honeywell Customized Temperature Control helps provide has aided us in approaching that goal."

MINNEAPOLIS
Honeywell

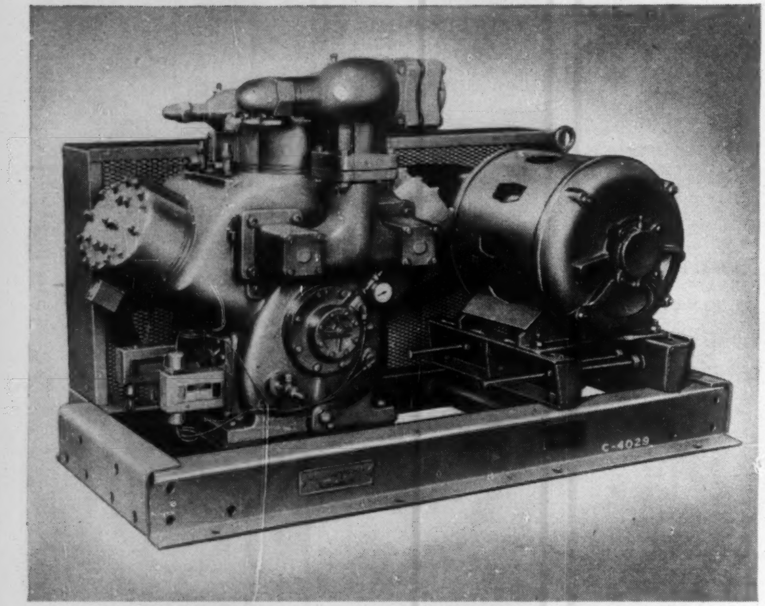
H HONEYWELL *First in Controls*

104 OFFICES ACROSS THE NATION

MINNEAPOLIS-HONEYWELL REGULATOR CO.
Dept. HA-1-07, Minneapolis 8, Minnesota
Gentlemen:
I'm interested in learning more about Honeywell Customized Temperature Control.

Name ....
Firm Name ....
Address ....
City .... *Zone* .... *State* ....

The whole industry's talking about Worthington's new Freon compressor



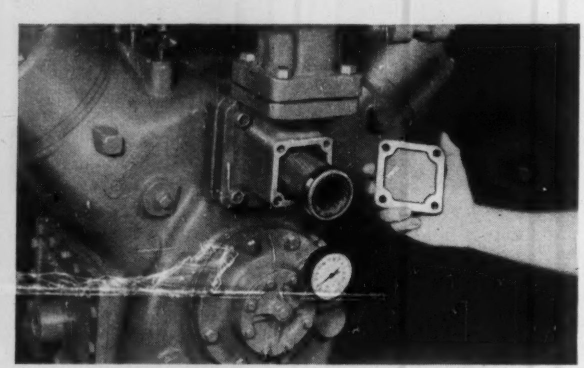
TRIM, STURDY CONSTRUCTION marks this 4JF6 compressor unit — 50-60 hp, six cylinder W-type compressor. The complete compact unit consists of fabricated steel base, compressor with valves, gauges and safety controls, drive and safety guard. Designed to operate in conjunction with Worthington evaporative condensers in localities where city water is scarce or high in cost. Also available with shell and tube condenser. Complete range from 3-150 hp.

"The high capacity unit we've been waiting for!"

"Greater operating efficiency!"

"There's nothing else like it!"

And every comment you hear is true! The refrigeration compressor is the most vital element of any air conditioning or refrigeration system. That's why Worthington spent years in developing the new "J" Freon compressor. That's why Worthington invested over a million dollars in compressor research. *And that's why you can't find its match in any other unit.* Only a few features of the new "J" Freon compressor are highlighted here — get the full story by contacting your nearest Worthington district office or write to Worthington Corporation, Air Conditioning and Refrigeration Division, Section A.4.33, Harrison, New Jersey.



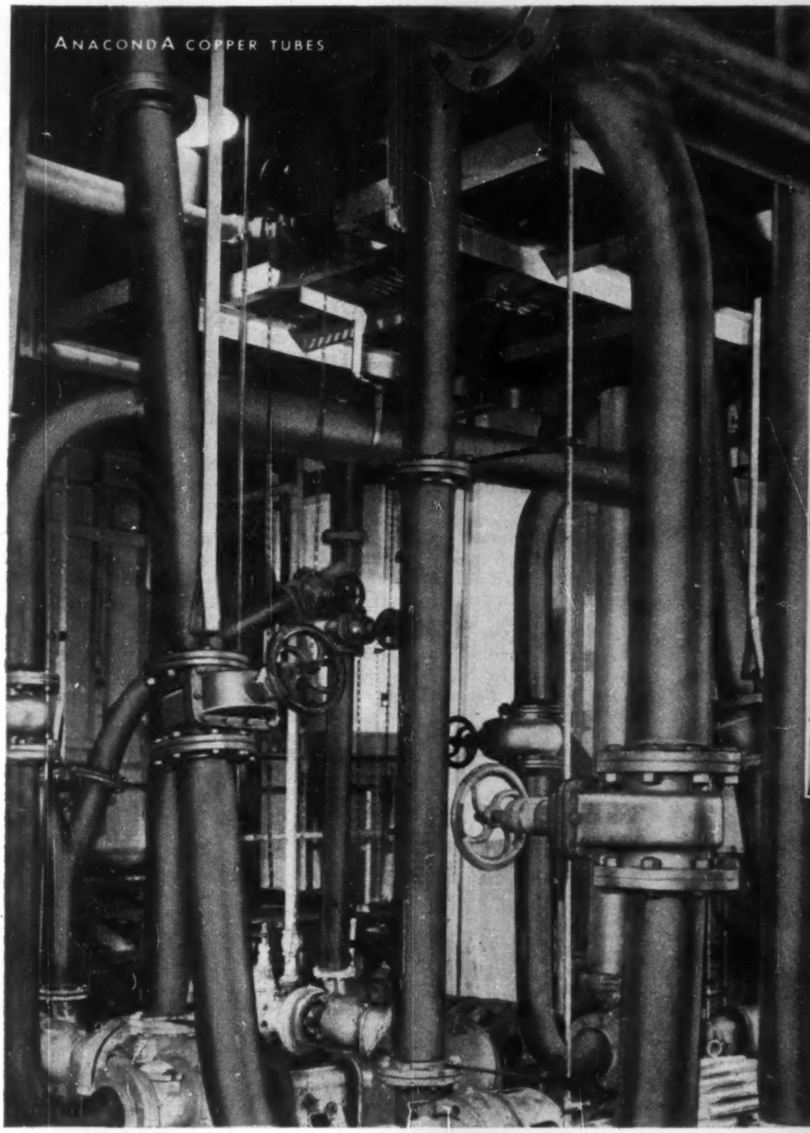
EASY REMOVAL of suction gas strainer for cleaning is made possible by new suction manifold design. No pipes, valves or other parts need to be dismantled in order to get at the strainer. And Worthington's new electric unloaders automatically balance power consumption with load requirements.

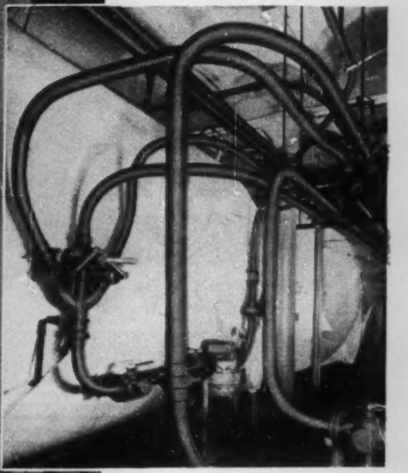
LORD & TAYLOR'S new West Hartford, Conn., store depends on Worthington to provide comfortable air conditioning for its customers. Two 150 hp "J" compressors and two evaporative condensers make up the highly efficient Worthington air conditioning team at this modern store.

A.4.33

WORTHINGTON

CLIMATE ENGINEERS TO INDUSTRY, BUSINESS AND THE HOME





FINISHED BEER is fed through 2-in. ANACONDA Copper Tubes to bottling room.

PUMPING ROOM of Liebmann Breweries, Inc., Brooklyn, N. Y. Notice the smooth bends and braze into main line (at top of picture). These are the kinds of savings you get with ANACONDA Copper Tubes.

VERSATILE COPPER:

Efficient, economical piping for brewers of Rheingold Beer

In the pictures above you'll find numerous reasons why ANACONDA *Copper Tube* pipelines are *economy* pipelines. They adapt easily to any plant layout and equipment. Long lengths of lightweight ANACONDA Copper Tubes speed assembly, too. They may be bent so you can clear beams, girders and other obstructions—without extra joints and fittings. And fewer fittings mean less flow resistance, lower pumping costs. ANACONDA Copper Tubes with solder-type fittings also permit you to make sound, economical connections. You can also dismantle and reassemble *copper* tube lines easily to meet changing plant conditions.

ANACONDA Copper Tubes are strong, rustproof and corrosion-resistant. They remain smooth and clean inside.

For reliable service on ANACONDA Copper and Copper Alloys — consult your Anaconda Distributor.

Write for free booklet, "ANACONDA Copper Tubes for Industrial Applications" to *The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.*

5332 (Rev.)

ANACONDA®

Makers of copper tubes for industrial processing, water, heating, soil, waste and vent lines; welding rods; flexible metal hose and tubing; heat exchanger tubes; bus conductors; sheet copper; refrigeration products.

Wagner®
ELECTRIC MOTORS
. . . the choice of leaders in industry

Wagner Hermetic Motors

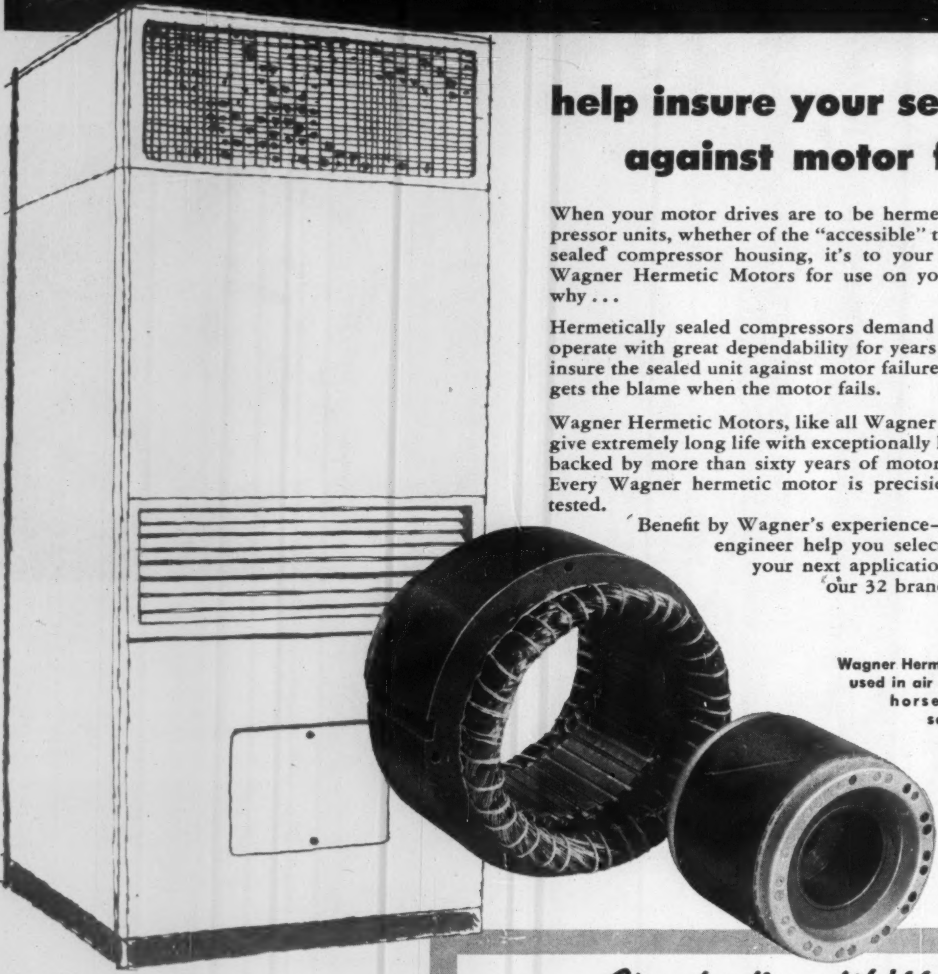
help insure your sealed units against motor failure

When your motor drives are to be hermetically sealed in compressor units, whether of the "accessible" type or in a completely sealed compressor housing, it's to your advantage to specify Wagner Hermetic Motors for use on your equipment. Here's why . . .

Hermetically sealed compressors demand motor parts that will operate with great dependability for years and years. They must insure the sealed unit against motor failure because your product gets the blame when the motor fails.

Wagner Hermetic Motors, like all Wagner motors, are known to give extremely long life with exceptionally little trouble. They are backed by more than sixty years of motor building experience. Every Wagner hermetic motor is precision-built and carefully tested.

Benefit by Wagner's experience—let a skilled Wagner engineer help you select the motor drive for your next application. Call the nearest of our 32 branch offices, or write us.



Wagner Hermetic Motor of the type used in air conditioners. This 7½ horsepower polyphase squirrel-cage motor is especially designed for use in sealed refrigeration units.

Hermetically sealed compressors for air conditioners and refrigerating equipment are rapidly gaining preference because of the great convenience they offer to users of the equipment—there is nothing to oil or adjust, no belts to fail.

Standardize with Wagner:

Wagner Motors are the choice of many leading equipment manufacturers for several basic reasons:
First, Wagner Motors, for over sixty years, have established unexcelled records for continuous, trouble-free performance.
Second, Wagner Motors are well known for their superior quality and their sturdy design and construction.
Third, the many types of motors and motor modifications in the standard Wagner line help the design engineer in his selection of the right motor for the job.

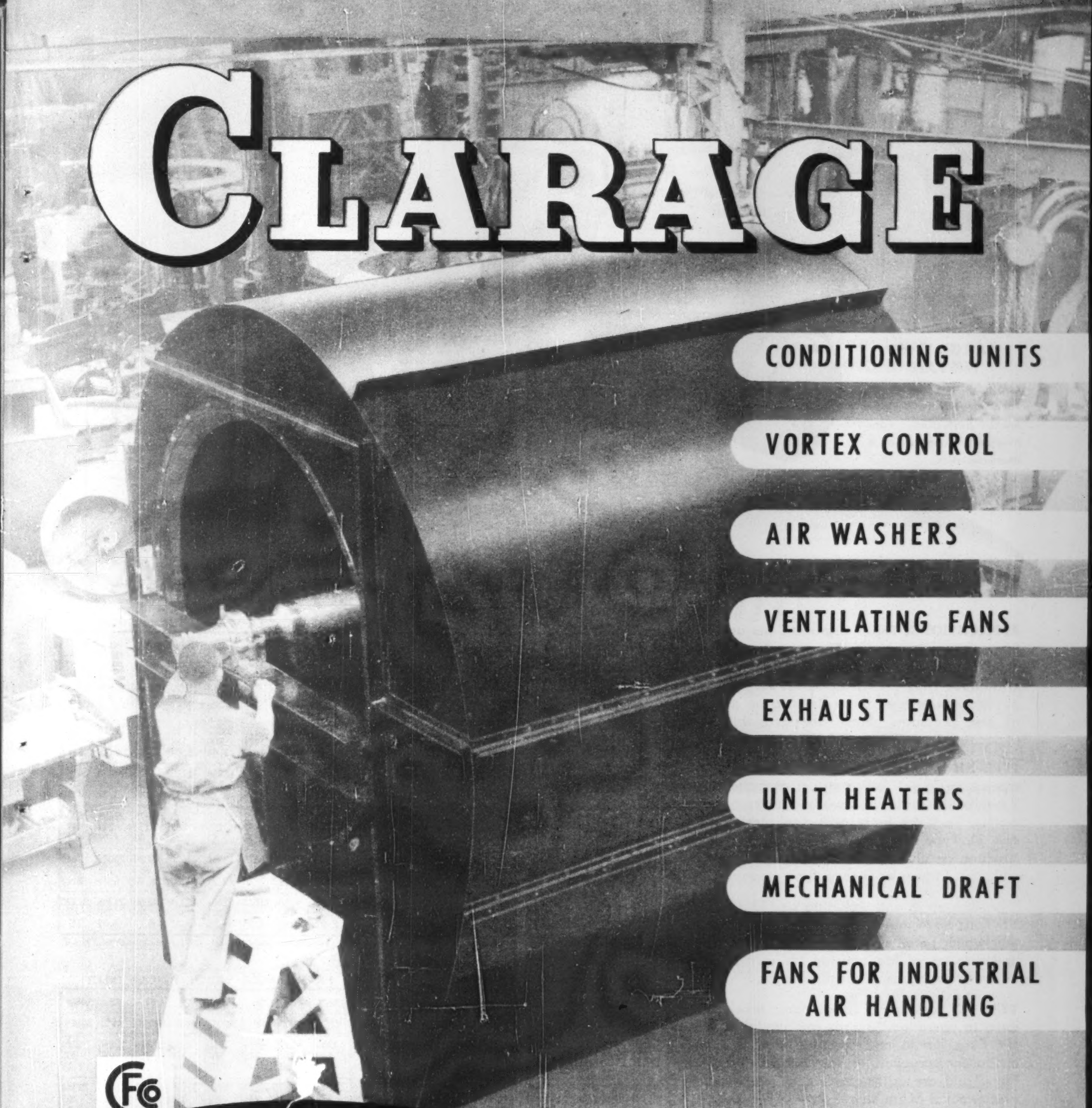
Wagner Electric Corporation
EST. WEC 1891

WAGNER ELECTRIC CORPORATION
6370 PLYMOUTH AVE., ST. LOUIS 14, MO., U. S. A.

ELECTRIC MOTORS
TRANSFORMERS
INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

M54-2



CLARAGE

- CONDITIONING UNITS
- VORTEX CONTROL
- AIR WASHERS
- VENTILATING FANS
- EXHAUST FANS
- UNIT HEATERS
- MECHANICAL DRAFT
- FANS FOR INDUSTRIAL AIR HANDLING

CFCo

You can rely on . . .

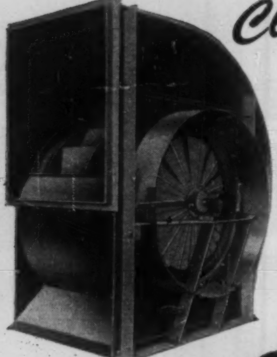
CLARAGE

CLARAGE FAN COMPANY
KALAMAZOO, MICHIGAN

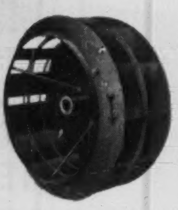
Headquarters for Air Handling and Conditioning Equipment

SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES • IN CANADA: Canada Fans, Ltd., 4285 Richelieu St., Montreal

Clarage HEAVY-DUTY *Equipment*

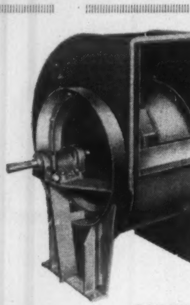


Vortex Control in fan inlet



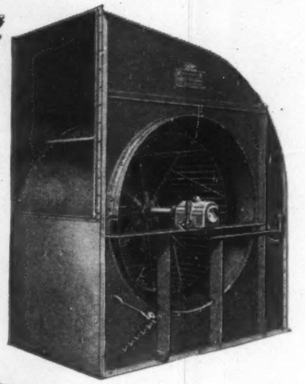
LARGE TYPE NH FAN

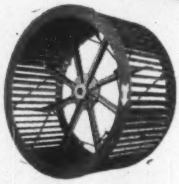
and large NH fan wheel. All Type NH Fans have motor-protecting, non-overloading performance characteristics.



SMALL TYPE NH FAN

and small NH fan wheel. These smaller fans are adjustable for 8 different directions of air discharge.





TYPE HV FAN

and HV fan wheel which is designed for extreme quietness of operation.

AIR HANDLING AND CONDITIONING FANS

APPLICATIONS: These Clarage Fans are built in two types as shown. They are used for air conditioning and ventilation in all types of buildings. They are also suitable for industrial applications where clean air is to be handled at low pressures. Sizes are available with capacities from 200 to 200,000 c.f.m.

TYPE NH are moderately high speed fans designed for quiet, efficient performance when V-belt or direct driven by standard high speed motors. They are built in 23 sizes starting with size 30. Type NH Fans have an all steel construction as illustrated. They can be furnished with anti-friction or sleeve type bearings.

In sizes up to and including size 73, the Type NH Fans have the Clarage side plate construction which permits easy removal of fan wheel and rotation of fan housing for any of eight different directions of air discharges.

TYPE HV are slow speed fans **exceedingly quiet in operation.** 28 sizes are available. Type HV Fans, up to and including size 3, are of similar construction to the smaller Type NH Fans, and are adjustable as to air discharge and removal of fan wheel. Type HV Fans in the larger sizes are constructed as illustrated. Dust-proof, oil-tight, sleeve bearings are standard equipment.

VORTEX CONTROL as shown above can be furnished on practically all types of Clarage Fans. It is used where requirements demand that the air volume be periodically or continuously changed. Vortex Control has the low first cost of damper control, and the efficient performance of variable speed control. It saves considerably in power cost.

ABBREVIATED PERFORMANCE—TYPE HV FANS, SINGLE WIDTH, SINGLE INLET

Fan Size No.		1	1¼	1½	1¾	2	2¼	2½	2¾	3	3¼	3½	4	4½
Wheel Dia.		13″	16¼″	19½″	22¾″	26″	29¼″	32½″	35¾″	39″	42½″	45½″	52″	58½″
¼″ S.P. 1200 O.V.	CFM	1035	1613	2322	3156	4128	5220	6444	7782	9288	10890	12660	16524	20880
	RPM	509	407	327	281	245	217	197	178	164	146	316	120	106
	HP	.12	.18	.22	.29	.38	.48	.59	.75	.85	1.04	1.22	1.59	2.00
½″ S.P. 1300 O.V.	CFM	1122	1748	2516	3419	4472	5655	6981	8430	10062	11798	13715	17910	22620
	RPM	637	510	412	353	308	273	247	224	206	188	174	152	135
	HP	.19	.29	.36	.49	.64	.81	1.00	1.20	1.44	1.64	1.90	2.48	3.13
¾″ S.P. 1400 O.V.	CFM	1208	1882	2709	3682	4816	6090	7518	9078	10836	12705	14770	19278	24360
	RPM	748	598	490	420	367	325	294	264	245	222	206	180	160
	HP	.28	.44	.54	.73	.95	1.20	1.48	1.76	2.13	2.45	2.85	3.72	4.70
1″ S.P. 1500 O.V.	CFM	1294	2016	2903	3945	5160	6525	8055	9727	11610	13613	15825	20655	26100
	RPM	851	680	557	478	417	369	335	302	279	252	233	204	181
	HP	.39	.61	.72	.98	1.28	1.61	1.99	2.38	2.87	3.28	3.80	4.97	6.26
1¼″ S.P. 1600 O.V.	CFM	1380	2150	3096	4208	5504	6960	8592	10375	12384	14520	16880	22032	27840
	RPM	944	754	618	530	463	410	371	336	309	280	261	228	203
	HP	.52	.80	.93	1.26	1.66	2.09	2.58	3.13	3.72	4.33	5.02	6.55	8.27
1½″ S.P. 1800 O.V.	CFM	1552	2420	3482	4734	6192	7830	9666	11672	13932	16335	18990	24786	31320
	RPM	1039	830	683	585	512	453	410	369	341	308	286	250	222
	HP	.70	1.09	1.30	1.77	2.31	2.92	3.61	4.25	5.20	5.82	6.77	8.82	11.1

NOTE: For performance of double width, double inlet HV Fans (available in sizes No. 1½ and larger) multiply CFM x 2, RPM x 1.015, BHP x 2.1 and OV x 1.11.

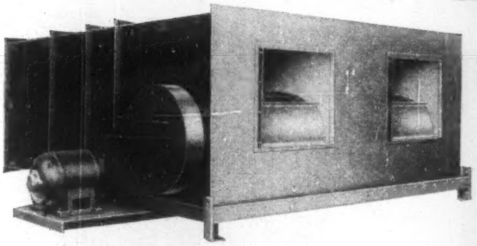
ABBREVIATED PERFORMANCE — TYPE NH FANS, SINGLE WIDTH, SINGLE INLET

Fan Size No.		30	33	36½	40	49	54	60	66	73	80½	89	98	108½
Wheel Dia.		15″	16½″	18¼″	20″	24½″	27″	30″	33″	36½″	40¼″	44½″	49″	54¼″
¼″ S.P. 1000 O.V.	CFM	1270	1560	1900	2300	3450	4200	5150	6270	7650	9330	11410	13850	16920
	RPM	768	699	627	572	463	419	378	343	304	276	250	227	205
	HP	.093	.114	.13	.16	.24	.29	.36	.43	.53	.64	.79	.96	1.17
½″ S.P. 1200 O.V.	CFM	1524	1872	2280	2760	4140	5040	6180	7524	9180	11196	13692	16620	20304
	RPM	988	899	806	735	595	539	486	441	391	355	321	291	263
	HP	.197	.242	.29	.35	.51	.62	.76	.93	1.12	1.36	1.67	2.02	2.47
¾″ S.P. 1300 O.V.	CFM	1651	2028	2470	2990	4485	5460	6695	8151	9945	12129	14833	18005	21996
	RPM	1139	1036	932	850	688	624	562	510	452	410	371	337	305
	HP	.298	.367	.44	.53	.78	.95	1.16	1.41	1.70	2.07	2.53	3.07	3.76
1″ S.P. 1400 O.V.	CFM	1778	2184	2660	3220	4830	5880	7210	8778	10710	13062	15974	19390	23688
	RPM	1276	1161	1047	955	774	700	631	573	508	461	417	378	342
	HP	.415	.510	.61	.73	1.08	1.31	1.61	1.96	2.37	2.89	3.54	4.29	5.25
1¼″ S.P. 1500 O.V.	CFM	1905	2340	2850	3450	5175	6300	7725	9405	11475	13995	17115	20775	25380
	RPM	1403	1276	1152	1051	851	771	695	631	559	507	459	417	376
	HP	.546	.671	.80	.97	1.42	1.73	2.12	2.58	3.13	3.82	4.67	5.66	6.92
1½″ S.P. 1600 O.V.	CFM	2032	2496	3040	3680	5520	6720	8240	10032	12240	14928	18256	22160	27072
	RPM	1522	1385	1251	1141	924	838	754	685	607	551	498	453	409
	HP	.693	.852	1.01	1.23	1.81	2.20	2.70	3.29	3.98	4.85	5.93	7.20	8.80

NOTE: For performance of double width, double inlet Type NH Fans (available in all sizes) multiply CFM x 2, RPM x 1.02, BHP x 2.08 and OV x 1.11.

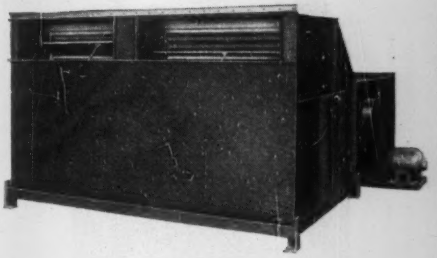
CLARAGE FAN COMPANY, Kalamazoo, Michigan

Clarage HEAVY-DUTY *Equipment*



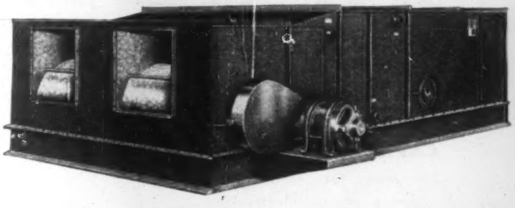
MULTITHERM CONDITIONING UNIT

Horizontal type for ceiling or platform installation — vertical floor type units also available.



BLOW-THRU MULTITHERM ➔

with zone control providing uniform conditioning results in various parts of building by compensating for variable heat and cooling loads.



➔ **CAPILLARY CONDITIONING UNIT**

Horizontal type for ceiling or platform installation — vertical floor type capillary units also available.

AIR CONDITIONING UNITS

APPLICATIONS: Clarage Multitherms are ideal for industrial services, both comfort and process applications. Where products are weather-sensitive, they help speed production, insure uniform quality, decrease spoilage. Multitherms are equally suitable for conditioning offices, restaurants, stores, hospitals, etc.

The equipment cost is relatively low, and units can be installed as easily and inexpensively as unit heaters — **no drastic building alterations necessary.**

Multitherms can be furnished to provide all functions of year-round air conditioning, summer cooling, or winter conditioning only. Units are **extremely quiet** in operation. Aside from filter renewal and occasionally oiling the fan bearings, Multitherms require no attention summer or winter.

BLOW-THRU MULTITHERMS are conditioning units designed to maintain required temperatures and humidities in zones having different simultaneous loads.

A single unit is capable of air conditioning an **entire** medium size building providing in each zone, despite solar variations, wind velocities, etc., uniform air conditioning results; or different conditions in each zone as desired.

Zone control is accomplished by means of a separate pair of mixing dampers for each zone. One damper of each pair connects to a hot air plenum; the other to a cold air plenum. Each pair of dampers is so interconnected that one zone thermostat controls the hot and cold air mixture. Blow-Thru Multitherms are offered in 10 sizes with capacities ranging from 500 to 22,000 c.f.m.

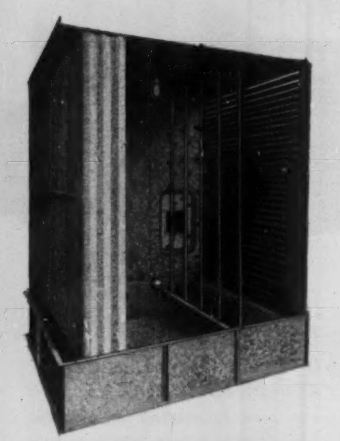
CAPILLARY AIR CONDITIONING UNITS are recommended where **exceptionally** thorough air cleaning, as well as temperature and humidity control, are required. They are used for both comfort and process applications.

The basic part of a capillary conditioning unit is the cell, each of which is a rectangular casing filled with an oriented mass of approximately 57,000 fine glass filaments. Capillary action, air flow and gravity combine to spread the spray water over each cell into a film exceeding 125 sq. ft. in area. Since minimum spray water is necessary and the sprays operate at low pressure, considerable savings in power and in initial cost of pumping equipment are effected. 7 sizes are available with basic capacities 1,800 to 20,000 c.f.m.

MULTITHERM PHYSICAL DATA

UNIT SIZE	CFM RANGE	Fan Outlet Area Sq. Ft.	FANS		Coil Face Area Sq. Ft.	Motor HP Range	FILTER SECTION DATA								
							Flat			Angle			Flat (Hi-Velocity)		
			No.	Size			No.	Size	Max. CFM	No.	Size	Max. CFM	No.	Size	Max. CFM
1205	500 — 1000	0.53	1	⅝	1.58	¼ — ½	1	20 x 25	1000				1	20 x 25	1500
1210	700 — 1600	1.13	1	⅞	2.63	¼ — 1	2	16 x 20	1280	2	20 x 25	2000	2	16 x 20	1920
1215	1500 — 2800	1.50	2	¾	4.73	¼ — 1½	2	20 x 25	2000	4	20 x 25	4000	2	20 x 25	3000
1820	1900 — 3700	2.26	2	⅞	6.05	¼ — 2	2	20 x 25	2000	4	20 x 25	4000	2	20 x 25	3000
1830	3000 — 5300	2.57	2	1	9.20	⅓ — 3	3	20 x 25	3000	6	20 x 25	6000	3	20 x 25	4500
1840	4000 — 7500	4.08	2	1¼	12.38	⅓ — 5	4	20 x 25	4000	8	20 x 25	8000	4	20 x 25	6000
2450	5000 — 9000	4.93	2	1⅜	15.10	½ — 5	8	16 x 20	5120	12	20 x 25	12000	8	16 x 20	7680
3060	6000—11000	5.80	2	1½	17.90	½ — 7½	6	20 x 25	6000	12	20 x 25	12000	6	20 x 25	9000
3680	8000—15000	7.87	2	1¾	24.76	¾ —10	8	20 x 25	8000	16	20 x 25	16000	8	20 x 25	12000
4120	12000—22000	10.31	2	2	36.24	1½—15	12	20 x 25	12000	20	20 x 25	20000	12	20 x 25	18000

Clarage HEAVY-DUTY *Equipment*



SPRAY SYSTEM AIR WASHER

Offered in four different types as shown below.

CAPILLARY TYPE AIR WASHER

Designed for extremely thorough air cleaning and purification.

UNICOIL UNIT

Combining in single assembly all elements required for efficient heat transfer.

AIR WASHERS AND UNICOILS

APPLICATIONS: Clarage Spray Type Air Washers are recommended for comfort air conditioning, for dust removal and for product reclamation. They clean the air thoroughly, and provide a humidifying or dehumidifying effect as desired. As shown, 4 types are available. Capacities, based on 500-feet air velocity, range from 2,000 to 193,000 c.f.m.

FEATURES: Spray Type Washers are designed and built to give efficient, dependable service for many years. Operation and upkeep costs are extremely low, erection time is considerably below average, and all washer parts are readily accessible.

The spray systems utilize centrifugal type, bronze alloy nozzles. Friction losses through these nozzles are **low**, insuring an adequate pressure head for spray effect with minimum size recirculating pump and small power requirements.

Standard equipment includes an inspection door and inlet louvre. Pump controls and other accessories can be furnished. Spray Type Washers are built of galvanized steel to provide protection against corrosive action. Special constructions can be furnished.

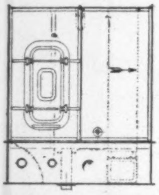
CAPILLARY AIR WASHERS are primarily used for industrial air conditioning services which require spray type equipment having **maximum air cleaning efficiency.** Basic parts are the capillary cells, each of which is a rectangular casing filled with approximately 57,000 fine glass filaments.

Capillary Air Washers require minimum spray water at low pressure. Savings in pump power cost and initial cost of pumping equipment are considerable. Sizes range from 4,400 to 132,000 c.f.m.

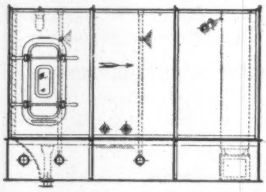
UNICOIL UNITS are a modern development for use as an integral part of a central station system for heating or cooling, or both; or for complete air conditioning in comfort applications. Unicoils are offered in a large range of sizes.

A standard unit consists of finned-copper coils, galvanized eliminator plates, galvanized settling tank and galvanized casing with inspection door.

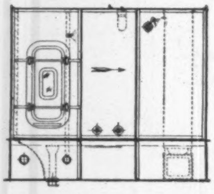
Here is ideal equipment to specify and install. It combines in one structure all elements necessary for efficient heat transfer. It eliminates assembling different parts on the job, thereby saving installation time and money.



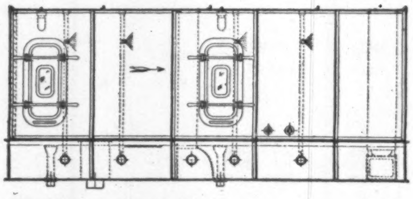
TYPE H: for air washing, purifying, and humidifying — the least expensive type. One main spray system; one set of eliminators. Length, 4 ft. 11 in.



TYPE CWW: for heavy duty humidifying, cooling and dehumidifying with cold or refrigerated water, or for condenser water cooling. Two main spray systems; one set of eliminators. Length, 8 ft. 10 in.



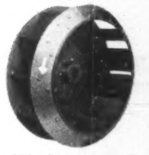
TYPE V: for washing, purifying and humidifying — a most efficient type. One main spray system; one set of eliminators with flooding spray. Length, 6 ft. 11 in.



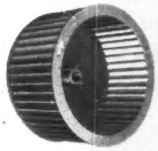
TYPE CWW — TWO STAGE: for cooling and dehumidifying with cold city or well water, industrial dust removal or material reclamation. Two main spray systems; one set of eliminators in each stage. Length, 14 ft. 0 in.

CLARAGE FAN COMPANY, Kalamazoo, Michigan

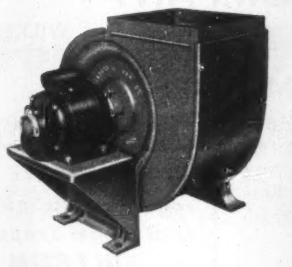
Clarage HEAVY-DUTY *Equipment*



High speed, non-overloading Ready Unit wheel.

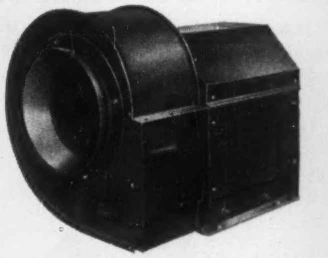


Slow speed, multiblade type Ready Unit wheel.

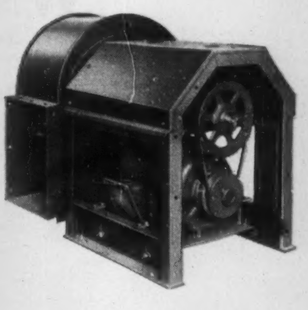


DIRECT DRIVE READY UNIT

Smaller sizes have cast iron housings — larger sizes have steel housings as shown here.



Ready Unit Ventilating Set equipped with Outdoor Covers for installation out-of-doors — covers easily removable.



V-BELT READY UNIT

This Clarage standard V-belt design provides protection to working parts — drive, motor and bearings within framework of unit.

READY UNIT VENTILATING SETS

APPLICATIONS: Ready Units are suitable for handling small ventilating supply and exhaust jobs of many types — widely used in laboratories, factories, offices, restaurants, radio stations, TV studios, homes, etc. They are noted for **quiet, economical performance.** 18 sizes are available with capacities 100 to 12,000 c.f.m.

CONSTRUCTION: All units are furnished **complete ready to run,** either equipped with AC or DC motors as required. They are built for both direct motor and V-belt drive as shown. Direct motor driven units have cast iron housings in the two smaller sizes; steel housings in the larger sizes. All V-Belt units have steel housings. Smaller size units are equipped with multiblade type wheels only; larger sizes with either multiblade or non-overloading wheels. Direct driven units have the fan wheel mounted on the motor shaft — no fan bearings necessary. V-belt units are furnished with graphite-bronze bearings that seldom require attention (oiling). Specially constructed units for handling corrosive gases and for other special conditions can be furnished.

All units can be equipped with Clarage Vortex (capacity) Control which has the low first cost advantage of a damper and the power saving feature of variable speed control.

OUT-DOOR INSTALLATIONS: Where it is essential or advantageous to locate the fan equipment out-of-doors, Ready Units can be furnished in all sizes to meet such requirements by the addition of Outdoor Covers to standard assemblies. These covers are built as shown with openings at the top for bearing lubrication, and are easily removable for access to bearings, motor and drive. Clarage Ready Units on outdoor installations give dependable, long-lasting service.

ABBREVIATED PERFORMANCE — DIRECT CONNECTED UNITS

Unit No.		H.P. Motor	Speed°		CAPACITY IN CU. FT. PER MINUTE					
					RESISTANCE (SP) W. G.					
					⅛"	¼"	⅜"	½"	¾"	1"
½ Half Width		1/20	850	cfm	141	20				
				ov	1620	229				
	*	1/8	1150	cfm	180	157	127			
				ov	2065	1800	1455			
	**	1/6	1725	cfm	287	275	259	245	210	
				ov	3290	3150	2970	2810	2410	
½ L.S.		1/20	850	cfm	242	41				
				ov	1200	209				
	*	1/8	1150	cfm	360	315	255			
				ov	1800	1600	1300			
	**	1/6	1725	cfm	575	550	518	490	420	
				ov	2900	2800	2630	2500	2100	
⅝ L.S.		1/20	850	cfm	515	450				
				ov	1690	1480				
	*	1/8	1150	cfm	735	680	625	560		
				ov	2400	2200	2050	1825		
	**	1/2	1740	cfm	1153	1130	1059	1040	970	885
				ov	3550	3480	3400	3380	3180	2850
¾ L.S.		1/4	860	cfm	975	875	765	640		
				ov	2000	1800	1575	1318		
	*	1/2	1150	cfm	1400	1300	1225	1135	965	785
				ov	2882	2675	2520	2337	1990	1616
	**	1 1/2	1740	cfm	2180	2100	2060	1990	1890	1780
				ov	4490	4325	4242	4100	3892	3660
⅞ H.S.		1/20	850	cfm	550	365	110			
				ov	830	552	167			
	*	1/8	1150	cfm	825	710	575	400		
				ov	1125	1072	870	605		
	**	1/3	1725	cfm	1335	1270	1190	1110	940	730
				ov	2010	1920	1800	1690	1420	1105
1 H.S.		1/8	850	cfm	875	685	455	120		
				ov	1015	793	528	139		
	*	1/6	1150	cfm	1275	1145	1000	835	435	
				ov	1475	1327	1158	967	504	
	**	3/4	1740	cfm	2010	1940	1860	1780	1600	1390
				ov	2315	2223	2153	2031	1850	1612
1⅛ H.S.		1/8	860	cfm	1310	1110	865	575		
				ov	1193	1005	788	524		
	*	1/3	1150	cfm	1860	7020	1580	1400	1000	530
				ov	1694	1570	1440	1276	912	483
	**	1	1740	cfm	2930	2850	2760	2665	2475	2245
				ov	2670	2600	2517	2430	2255	2050
1¼ M.S.		1/4	860	cfm	1595	1470	1300	1110		
				ov	1186	1095	967	825		
	*	1/3	1150	cfm	2175	2130	2050	1940	1690	1400
				ov	1615	1585	1525	1445	1255	1040
	**	1 1/2	1740	cfm	3305	3290	3280	3240	3130	2980
				ov	2460	2445	2440	2410	2330	2217
1½ M.S.	*	1/2	860	cfm	2950	2875	2760	2625	2250	
				ov	1525	1485	1425	1355	1162	
	**	1	1150	cfm	4050	3965	3900	3850	3660	3430
				ov	2095	2050	2015	1990	1890	1770
1¾ M.S.	*	1	860	cfm	4725	4625	4520	4400	4075	3590
				ov	1795	1760	1720	1670	1550	1365

Units marked * are moderately quiet. Units not starred are very quiet in operation. Units marked ** are not quiet and only should be used for industrial applications.

CLARAGE FAN COMPANY, Kalamazoo, Michigan

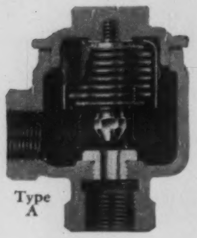
W. H. NICHOLSON & COMPANY

198 OREGON STREET STOCKS OF STEAM TRAPS CARRIED BY AGENTS IN ALL PRINCIPAL CITIES **WILKES-BARRE, PA.**

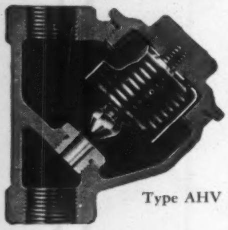
NICHOLSON INDUSTRIAL STEAM TRAPS

A survey of large industrial and institutional users of Nicholson thermostatic stream traps showed these main reasons for the increasing standardization on Nicholson units for specific applications:
1. Two to six times average drainage capacity. 2. Operate at lower temperature differential. 3. No air-binding. 4. Freeze-proof. 5. Only one moving part. 6. No need to change valves for varying pressures. 7. Record low for steam waste.

FOR COMPLETE DETAILS regarding Nicholson Industrial Steam Traps send for BULLETIN 853

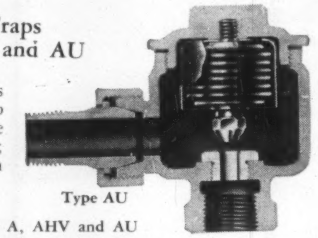

Type A

Recommended for the individual drainage of jacketed kettles, driers, hot water heaters, sterilizers, unit heaters, radiators, pipe coils, steam mains, drips, dry kilns, plastic moulding platens, vulcanizing machines, tracer lines in refineries and chemical plants, cookers, coffee and hot water urns, dish heaters, vegetable steamers, bakers' proof boxes, steam tables, ironers, presses, mangles, etc. Also for automatic air venting of mechanical traps, receivers, etc.


Type AHV

Industrial Traps Types A, AHV and AU

For pressures from vacuum to 200 lbs. Bronze construction; aluminum painted.


Type AU

*Maximum Capacity in Pounds per Hour at Various Pressure Differentials—Types A, AHV and AU

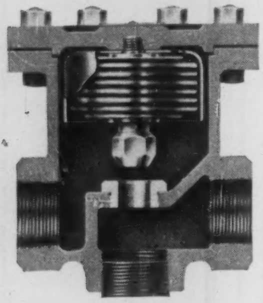
Size, Inches	1 Lb.	2 Lbs.	5 Lbs.	10 Lbs.	15 Lbs.	20 Lbs.	40 Lb.
¼—⅜	865	1,220	1,915	2,695	3,290	3,780	5,290
½—¾	865	1,220	1,915	2,695	3,290	3,780	5,290
1	1,020	1,440	2,270	3,190	3,900	4,475	6,250

Size, Inches	50 Lbs.	60 Lbs.	80 Lbs.	100 Lbs.	125 Lbs.	150 Lbs.	175 Lbs.	200 Lbs
¼—⅜	5,885	6,400	7,310	8,120	8,925	9,775	10,400	11,090
½—¾	5,885	6,400	7,310	8,120	8,925	9,775	10,400	11,090
1	6,955	7,590	8,660	9,600	10,570	11,590	12,310	13,100

List Prices—Types A, AHV and AU

Size, Inches	Types A and AHV			Type AU			Valve Orifice, Inches
	With Bellows of			With Bellows of			
	Bronze	Monel	Stainless	Bronze	Monel	Stainless	
¼—⅜—½	$17 60	$20 90	$24 90	$19 05	$22 40	$26 40	5/16
¾	19 05	22 40	26 40	20 50	23 85	27 85	5/16
1	21 30	23 65	28 65	23 45	26 80	30 80	23/64

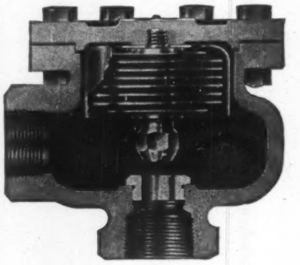
Types A, AU and C are made in angle type only, with horizontal inlet and vertical outlet—Type AU has union connection on inlet. All three types drain completely when cold and will not freeze. Type AHV especially applicable to drainage problems where necessary or desirable to have all piping run horizontally or vertically, or close to floor, wall or pillar. Type B, made with horizontal inlet and optional horizontal or vertical outlet offers either angle or horizontal straight-through connections. Types AHV and B traps are not freeze-proof.


Type B

Types B and C

For Pressures from Vacuum to 250 lbs.—Types B & C—Semisteel Construction—Aluminum Painted.

For Pressures to 300 lbs. with Superheat — Type C Traps only — Cast Steel Construction with Stainless Steel Bellows.


Type C

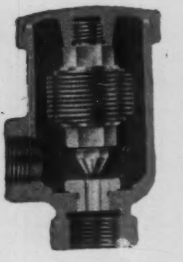
List Prices—Types B and C

Size, Inches	Types B and C			Type C Only		Valve Orifice, Inches
	Semisteel With Bellows of			Cast Steel With Bellows of		
	Bronze	Monel	Stainless	Monel	Stainless	
½	$25.85	$29.20	$33.70	$41.35	$45.45	⅜
¾	33 90	38.30	45.25	53.70	60 30	7/16
1—1¼	40 40	43.95	50.15	63.00	69.65	½
1½—2	59.80	64.45	71.10	91.00	97.65	¾

*Maximum Capacity in Pounds per Hour at Various Pressure Differentials—Types B and C

Size, Inches	1 Lb.	2 Lbs.	5 Lbs.	10 Lbs.	15 Lbs.	20 Lbs.	40 Lbs.	50 Lbs.	60 Lbs.	80 Lbs	100Lbs.	125Lbs.	150Lbs.	175Lbs.	200Lbs.	225Lbs.	250Lbs.	C. Steel 300Lbs.
½	1,140	1,610	2,530	3,560	4,350	4,990	6,980	7,775	8,460	9,660	10,720	11,800	12,920	13,750	14,640	15,380	16,090	17,400
¾	1,695	2,385	3,760	5,290	6,450	7,420	10,350	11,540	12,560	14,350	15,910	17,500	19,190	20,400	21,720	22,800	23,870	25,820
1—1¼	2,120	2,985	4,700	6,610	8,070	9,260	12,960	14,430	15,710	17,930	19,900	21,880	23,980	25,500	27,200	28,500	29,850	32,300
1½—2	3,200	4,510	7,100	9,990	12,200	14,000	19,600	21,800	23,750	27,120	30,100	33,100	36,300	38,600	41,100	43,200	45,150	48,900

***Capacities shown are maximum for average operating conditions with valve orifice wide open for one hour. To prevent continuous trap operation or condensate back-up, traps should be selected which have capacities from two to ten times the expected normal condensation load, using the lower factor when all operating conditions are favorable, and varying from that figure up to the highest factor, depending on quantity and severity of adverse conditions encountered.**


Type D

Type D Industrial Trap

For pressures from vacuum to 200 lbs. Bronze construction, aluminum painted. Made in angle type only, with horizontal inlet and vertical outlet. Drain completely when cold, and will not freeze.

Max'm Cap'y in Pounds per Hour at Various Pressure Differentials—Type D

SIZES	1 lb.	2 lbs.	5 lbs.	10 lbs.	15 lbs.	20 lbs.	40 lbs.	50 lbs.
¼"—⅜"	310	450	695	975	1,190	1,360	1,910	2,125
½"—¾"	550	780	1,225	1,725	2,100	2,420	3,380	3,760

SIZES	60 lbs.	80 lbs.	100 lbs.	125 lbs.	150 lbs.	175 lbs.	200 lbs.
¼"—⅜"	2,280	2,630	2,935	3,210	3,535	3,740	4,020
½"—¾"	4,090	4,675	5,185	5,710	6,250	6,660	7,080

List Prices—Type D

Size, Inches	With Bellows of		Valve Orifice
	Bronze	Monel	
¼"	$14.00	$16.25	3/16"
⅜"	14.70	17.05	3/16"
½"	15.50	18.00	¼"
¾"	16.25	18.85	¼"

Other Products: Piston and Weight-Operated Steam Traps, Compressed Air Traps, 3 and 4-Way Cylinder Control Valves, Steel and Stainless Steel Floats, etc.

FOR RADIANT HEATING

choose easy-to-join

CHASE® COPPER TUBE

Easy to make solder joints are all you need with Chase Copper Tube. And a minimum of those! For easy-bending Chase Copper Tube comes in long lengths, cutting down the number of fittings required. There's just nothing better than Chase Copper Tube and its light weight makes it particularly desirable for ceiling and wall installations, too. Write today for FREE 50-page Book on Radiant Panel Heating.

CHASE COPPER TUBE TYPE L

Chase® BRASS & COPPER

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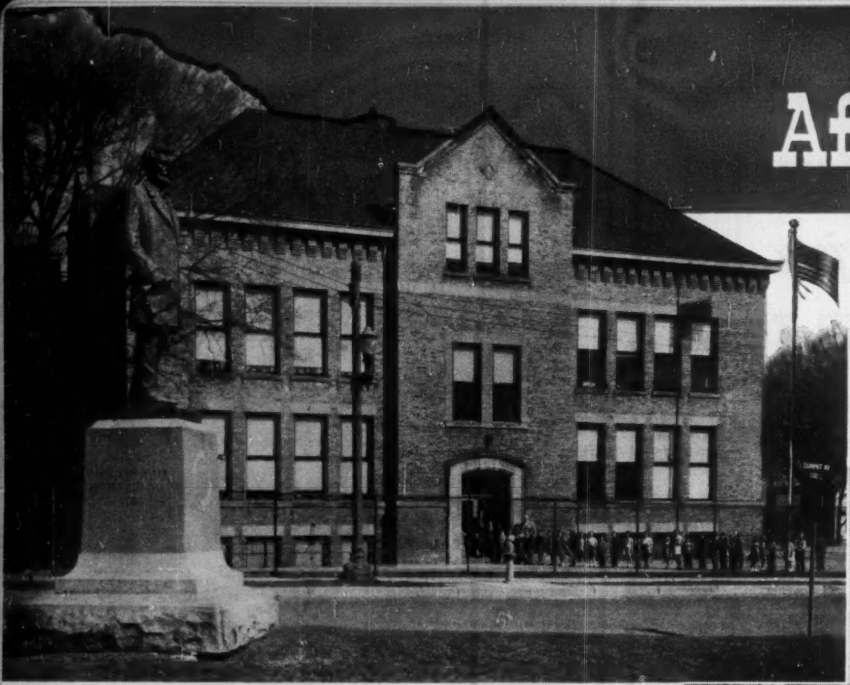
After 50 Years

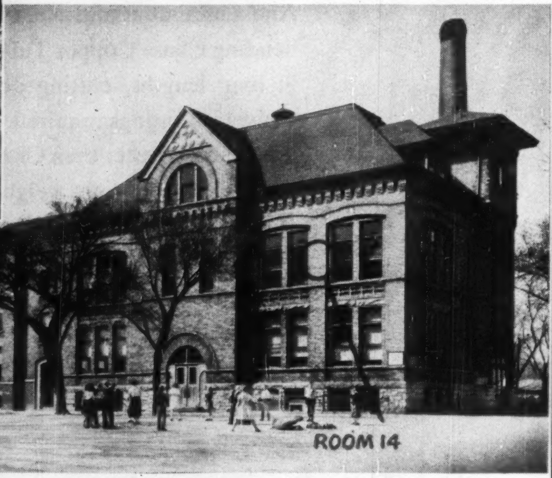


LINCOLN SCHOOL

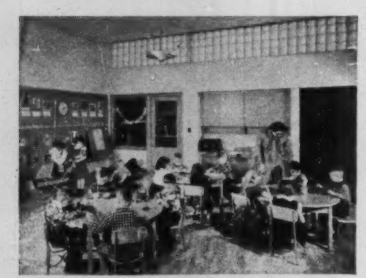
RACINE, WIS.

POWERS TEMPERATURE CONTROL

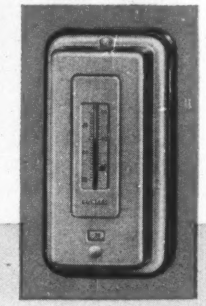
Installed here in **1903**

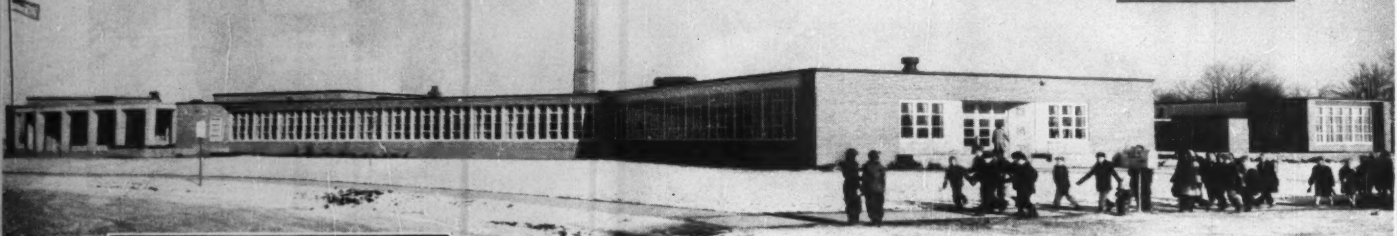


Above: One of a number of old and modern schools in RACINE equipped with Powers Control.



Below: RACINE'S New JERSTAD-AGERHOLM SCHOOL Completed in 1952 is also Powers controlled. Only a portion of the building appears in the photo. It has 14 classrooms, an administration and community center, playroom and kitchen, and audio-visual room. It is attractive inside and out —heating and ventilation are maintained with utmost economy.

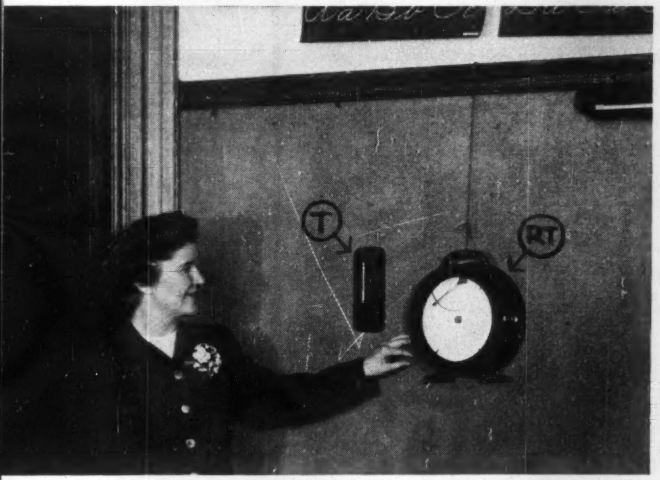




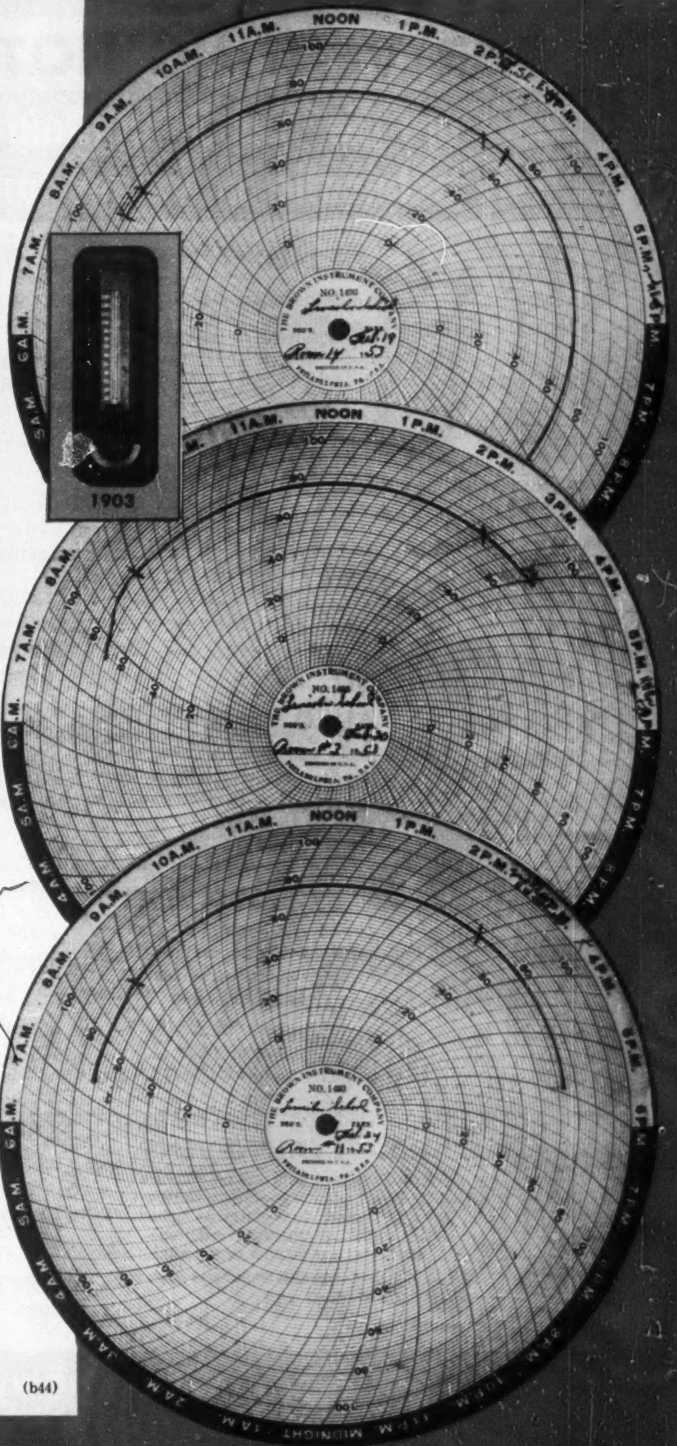
Architects and Engineers: WARREN S. HOLMES CO., Lansing, Mich.
Heating Contractor: N. A. THOMAS CO., Racine, Wis.

this test shows POWERS

Pneumatic System of
TEMPERATURE CONTROL IS STILL GIVING ACCURATE REGULATION



Miss K. Mart, Teacher in Room 14 Lincoln School, Racine, Wis. "T" is POWERS *Type A* Thermostat installed in 1903. It controls mixing dampers. Thermostat was set for 75° F. Note even control during schools hours. "RT" is Recording Thermometer which made charts at right in February 1953.



How is it possible for Powers systems to often give 25 to 50 years of dependable service?

Since 1891 outstanding features of a Powers thermostat have been: its powerful VAPOR-DISC with GRADUAL-ACTION and its famous non-bleed double valve. Proof of its superiority is revealed in the performance record shown here—as well as in many other old schools.

To get more years of better performance, greater comfort and fuel economy — install a POWERS pneumatic system of temperature control.

(b44)

THE POWERS REGULATOR COMPANY

SKOKIE, ILLINOIS

OFFICES IN OVER 50 CITIES IN U.S.A., CANADA, AND MEXICO • SEE YOUR PHONE BOOK

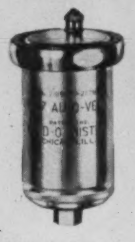
OVER 60 YEARS OF AUTOMATIC TEMPERATURE CONTROL

CHECK CHART

FOR VENTING HOT WATER SYSTEMS

Here are the "Big 5" in Maid-O'-Mist's COMPLETE line of fully automatic air valves for hot water heating systems

NO. 7 AND NO. 77 AUTO-VENTS

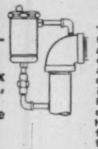


No. 7 AUTO-VENT Size 4⅜" x 2¼" with ⅛" I.P. female connection.

AUTO-VENT
MAID-O'-MIST
CHICAGO, ILL.

No. 77 AUTO-VENT Size 4⅜" x 2¼" with ⅛" I.P. female connection.

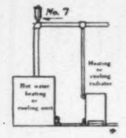
Self-closing, float-controlled valve — Non-ferrous metals — No air chamber required — Designed for working pressures up to 75 lbs.



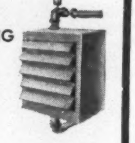
◀ The No. 77 is of the same design as the No. 7, except, that it has a ⅛" I.P. side opening to permit its use on overhead pipe lines, coils, etc., where headroom is a factor. The connections are made as illustrated.

FOR VERTICAL MOUNTING ONLY

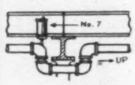
- FOR VENTING OVERHEAD MAINS OR RETURNS


No. 7
Hot water heating or cooling unit
Heating or cooling radiator

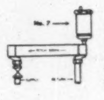
- FOR VENTING UNIT HEATER



- FOR VENTING TRAPPED MAINS AND CIRCULATING LINES



- FOR VENTING CONVECTORS



ACCESSORIES AND REPAIR PARTS

No. 777 VALVE CORE Removable self-closing unit

No. 7X BONNETT ASSEMBLY The entire Bonnett Assembly may be ordered for replacement.

No. 7A CONNECTOR FOR SAFE WASTE

MAID-O'-MIST
CHICAGO, ILL.

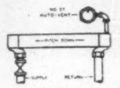
No. 27 AUTO-VENT Size 3" x 2½" with ⅛" I.P. female side connection.

NO. 27 AUTO-VENT

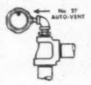
Dependable float-operated valve—Non-ferrous metals—No air chamber required—For working pressures up to 50 lbs.

FOR HORIZONTAL MOUNTING ONLY

- FOR VENTING CONVECTORS



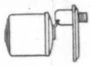
- FOR LIMITED SPACE APPLICATIONS



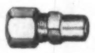
ACCESSORIES AND REPAIR PARTS

No. 777 VALVE CORE Removable self-closing unit

No. 27X BONNETT ASSEMBLY The entire Bonnett Assembly may be ordered for replacement



No. 7A CONNECTOR FOR SAFE WASTE



AUTO-VENT
MAID-O'-MIST

NO. 67 AUTO-VENT

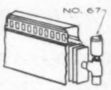
Self-closing, float-operated—Compact size—Non-ferrous metals—No air chamber required—For working pressures up to 30 lbs.

No. 67 AUTO-VENT Size 3-3/16" x 1½", with ⅛" I.P. male connection.

FOR VERTICAL MOUNTING ONLY

- FOR VENTING CONVECTORS

- FOR VENTING BASEBOARD RADIATION



ACCESSORIES AND REPAIR PARTS

No. 777 VALVE CORE Removable self-closing unit

No. 7A CONNECTOR FOR SAFE WASTE

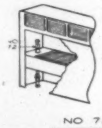
NO. 72 AUTO-VENT

Expansion and contraction confined to 4 vent slots only—Single composition control disc—internal siphon tube—No air chamber required—Can be set for manual or automatic venting.

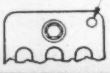
No. 72 AUTO-VENT Size 1¼" x ½" with ⅛" I.P. male connection.

FOR VERTICAL AND HORIZONTAL MOUNTING

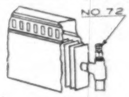
- FOR VENTING CONVECTORS

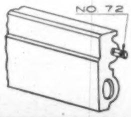


- FOR FREE STANDING RADIATORS



- FOR VENTING STEEL, COPPER OR CAST IRON BASEBOARD RADIATION





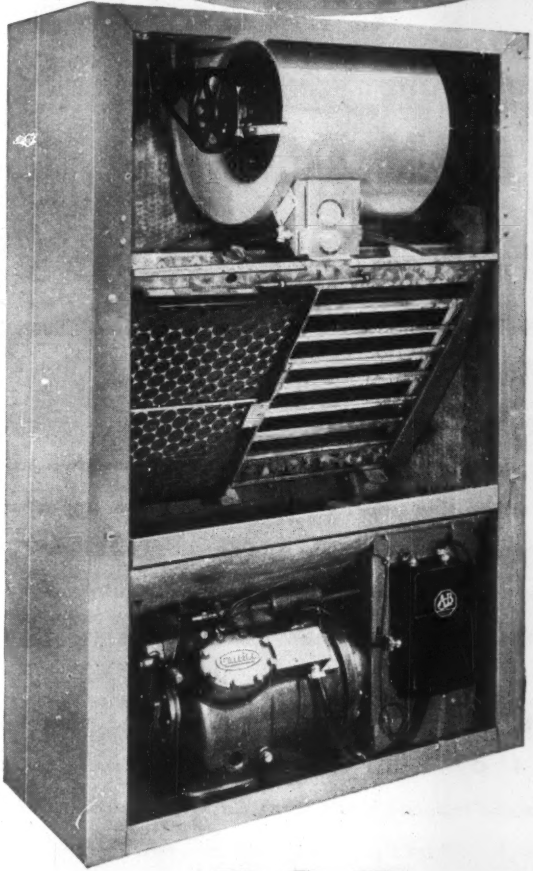
MAID-O'-MIST Inc.
HEATING SPECIALTIES

AUTOMATIC HUMIDIFIERS . . . . . AUTO-VENTS
WATER LINE CONTROLS . HEATING SPECIALTIES

MAID-O'-MIST, Inc.

3217 NORTH PULASKI ROAD . CHICAGO 41, ILL.

Carrier Units Are Safer . . .
because of
BS&B *Sealed Type* SAFETY HEADS



If you were to look inside a Carrier Air Conditioning Unit, you might not even notice the tiny safety guardian that's there to protect against loss of Freon and damage to the system should over-pressure develop. The BS&B SEALED TYPE SAFETY HEAD is no bigger than a man's thumb, yet it provides positive pressure relief and is guaranteed leak-proof.

Selected by Carrier and other manufacturers of air conditioning systems using Freon 12 or Freon 22 as the refrigerant, this low-priced "throw-away" unit provides that important *extra margin of safety* at a very nominal cost. Factory assembled and sealed, this little SAFETY HEAD consists of a brass body and fine silver rupture disc. The disc is designed to rupture at a safe predetermined pressure. When this happens, simply replace it with a complete new fitting—easily, quickly and inexpensively!

Thousands of BS&B SAFETY HEADS are now in use for primary or secondary relief. They're available for a variety of pressure-ratings and connection sizes. Investigate now! Write for free descriptive literature and prices.

BS&B
Safety Heads

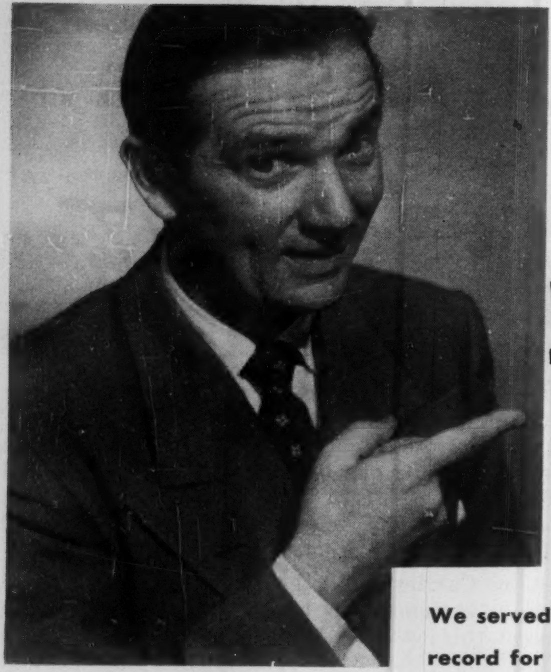
THE "CIRCUIT-BREAKER" OF
Any Pressured System

BS&B SEALED
TYPE SAFETY HEADS
comply with the standards established by the ASA B-9 Refrigeration Code and the ASME Unfired Pressure Code. Many cities now *require* air conditioning and refrigeration equipment to be equipped with safety devices which will comply with code requirements.

Safety Head Division, Dept. 2-DZ1

SAFETY HEADS
OVER 60 YEARS
BS&B

BLACK, SIVALLS & BRYSON, INC.
7500 East 12th Street Kansas City 26, Missouri



WE CAN DO THE SAME FOR YOU

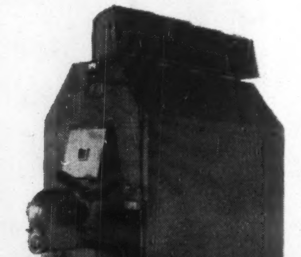
We served a lot of people in 1953, and we surpassed our own sales record for the fifth consecutive year. — But what's more important, we have had the satisfaction of supplying a wide variety of industries with a heater that did more than meet their heating requirements; it gave them valuable important extras. We can do the same for you!

Olson Heaters are built rugged for dependability and long life. Standard 10 gauge, 4" O.D. boiler tube, heat transfer surface with four gas passes, separate induced draft fan. Easy accessability to all parts. All popular parts. Dust tight, damp proof control panel box. Write for the detailed step by step catalog.

Olson

DIRECT FIRED HEATERS

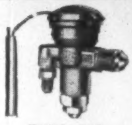
Gas, Oil, Coal or Dual Gas and Oil

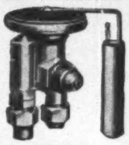


Arthur A. Olson & Company
Canfield, Ohio
Please send me your catalog F50.
Name ....
Firm Name ....
City .... **State** ....

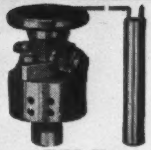
ARTHUR A. OLSON & COMPANY
BROAD ST. · CANFIELD, OHIO

THERMO EXPANSION VALVES


TYPE 402
with pressure limiting feature

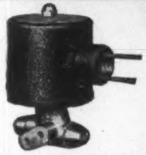

TYPE TK
"3 valves in 1"

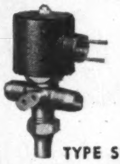
TYPE TCL

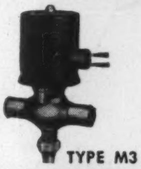

TYPE TR
Multi-Outlet

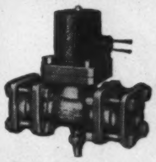
For automatic control of liquid refrigerant on all types of refrigeration and air conditioning systems. Capacities: from fractional tonnage to 50 tons "Freon-12", 100 tons Methyl Chloride. Low temperature valves for −40° F. to −100 F.

SOLENOID VALVES


TYPE S1

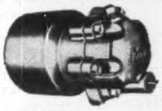

TYPE S2


TYPE M3

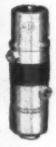

TYPE R2

For all types of service. For liquid: "Freon"—up to 75 tons. Methyl Chloride—up to 150 tons. For suction: "Freon"—up to 8.8 tons. Methyl Chloride—up to 17 tons. For brine, water, gas, air and steam.

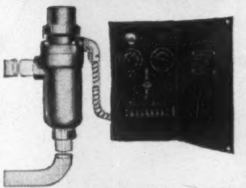
FLOAT VALVES AND SWITCHES


TYPE HK
high pressure float valve

Up to 5 tons "Freon-12", 10 tons Methyl Chloride and 20 tons Ammonia.

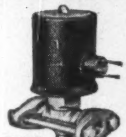

TYPE J5
electric float switch

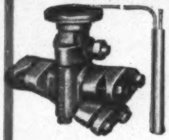
For "Freon", Methyl Chloride, Ammonia and other non-corrosive liquids having a specific gravity of .6 or more. Up to 460 volts AC and 250 volts DC.

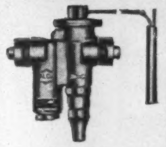

908
LECTRO-LEVEL
electronic remote control of liquid level

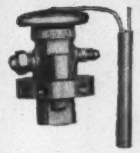
Accurate control for full-flooded evaporators. Adjustable to a wide range of level changes. Easy-to-set control dials conveniently mounted in remote box. Successfully used for over 5 years.

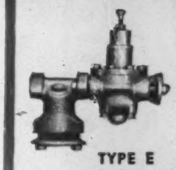
AMMONIA CONTROLS


TYPE M91F


TYPE TG

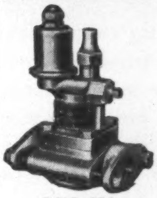

TYPE UG


TYPE TX

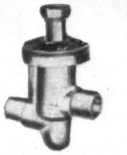

TYPE E
with Strainer

Solenoid Liquid Valves — up to 172 tons. Solenoid Suction Valves — up to 28 tons. Thermo Expansion Valves—from fractional tonnage to 125 tons. Automatic Expansion Valves — from fractional tonnage to 60 tons.

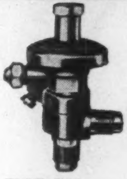
SUCTION LINE CONTROLS


TYPE EPR

For all refrigerants, with connection sizes up to 6"


TYPES 771-772
SUCTION PRESSURE REGULATORS HOLD-BACK VALVES

Prevent motor overload, Freon-12, Freon-22.


TYPE 760
"EVAPOTROL"

Pressure regulator—½ ton, "Freon-12"—¾ ton, Methyl Chloride.

ALCO VALVES

the COMPLETE LINE of refrigerant controls

For capacities in excess of those listed, write us for further details and give specific requirements.

ALCO ALSO MAKES: Constant Pressure Expansion Valves —Liquid and Suction Line Strainers.

ALCO

AVAILABLE AT YOUR WHOLESALER'S

ALCO VALVE CO.

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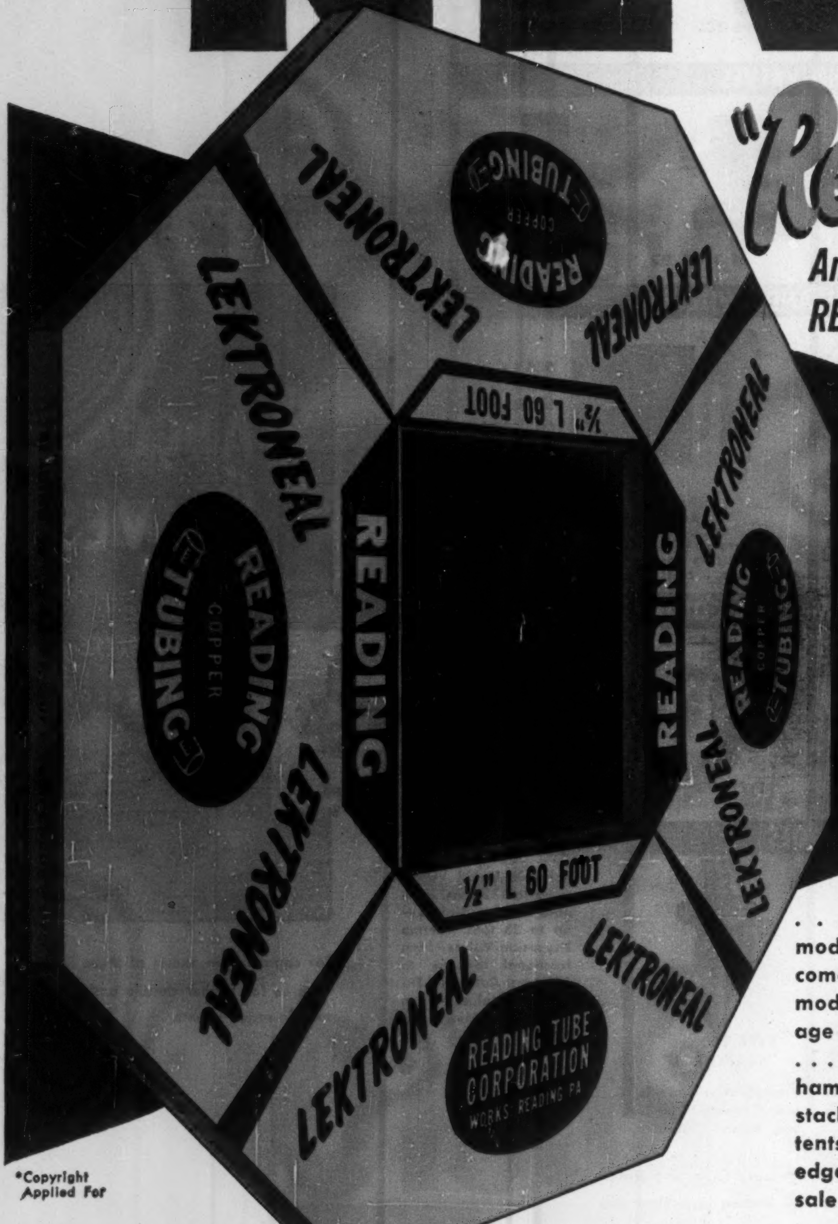
NEW


LEKTRONEAL
READING COPPER TUBING
LEKTRONEAL
LEKTRONEAL
READING COPPER TUBING
LEKTRONEAL
½" L 60 FOOT
READING
READING
LEKTRONEAL
READING COPPER TUBING
LEKTRONEAL
½" L 60 FOOT
LEKTRONEAL
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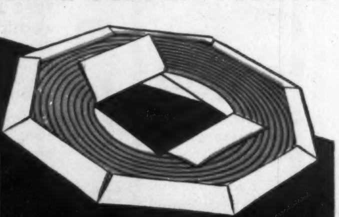
READING TUBE CORPORATION WORKS READING PA
LEKTRONEAL
LEKTRONEAL

"Readi-Pak"*

Another BIG PLUS for READING COPPER TUBE...



- Complete Protection!
- Easier to Handle!

Reading copper tube . . . produced in America's most modern copper tube mill . . . now comes packed in the industry's most modern container. Individual package is ready for job or re-shipping . . . no half-filled master cartons to hamper inventory. Readi-Pak* stacks or hangs compactly. Contents clearly labeled on sides and edges. Makes a colorful point-of-sale display, too!

*Copyright Applied For

READING TUBE CORPORATION

Producers of Reading Lektroneal Copper Tube and Reading 85% Grade A Red Brass Pipe

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OXford 5-1500
WORKS: Reading, Pa.

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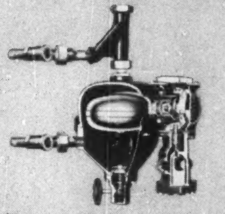
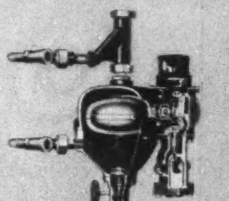
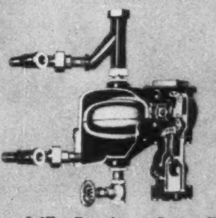
- Woodside, N. Y.
- Chicago, Ill., 724 W. 50th St.
- Houston, Texas, 1121 Rothwell St.
- Atlanta, Ga., 690 Murphy Ave., S. W. Unit 5, Bldg. B.



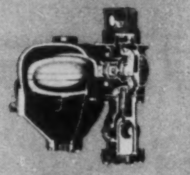
No. 47 Boiler Water Feeder — for hand-fired steam heating boilers up to 5000 sq. ft.



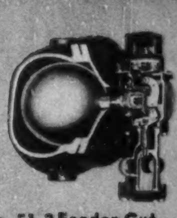
No. 47-2 Feeder - Cut - off Combination for automatically fired steam heating boilers up to 5000 sq. ft.



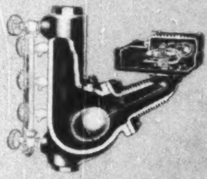
No. 147 Feeder Cut-off Combination — similar to No. 47, but with higher feeding level for small process boilers.



No. 247-2 — same as No. 47-2, but for installation with 1" equalizing pipes.



No. 51-2 Feeder Cut-off Combination — for automatically fired heating boilers over 5000 sq. ft.



No. 157 Water Column Type High Pressure Pump Control, Cut-off and Alarm—for boilers of any size up to 150 lbs. pressure.

No. 150 High Pressure Pump Control, Cut-off and Alarm—for boilers of any size up to 150 lbs. pressure.

McDONNELL PRODUCTS you should know

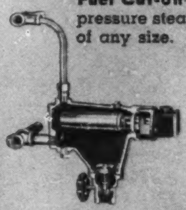
It isn't likely you'll ever use all these McDonnell Products. But for those special jobs that do come up it's good to know that McDonnell offers liquid level controls, flow switches and similar products for practically every need. Many of them are shown here. For full information, on these and the complete McDonnell line-up —

Write for complete new catalog

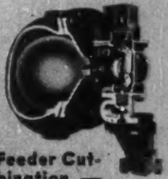
McDONNELL & MILLER, Inc.
3500 N. Spaulding Ave., Chicago 18, Illinois

Doing One MM SAFETY CONTROLS *Thing Well*

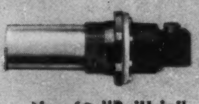
Your Jobber Stocks Them



No. 67 Low Water Fuel Cut-off—for low pressure steam boilers of any size.

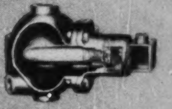


No. 53-2 Feeder Cut-off Combination — Similar to No. 51-2, but built for higher pressure, up to 75 lbs.

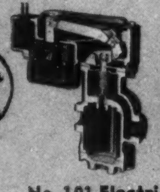


No. 69 "Built-in" Low Water Cut-off — Typical of many "built-ins" for installation in tappings provided in modern boilers.

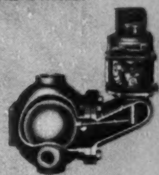
No. 767 Low Water Fuel Cut-off — (with No. 14 blow-off) for easy installation into opening in boiler.



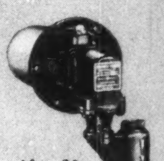
No. 61 Low Water Fuel Cut-off — for 1" equalizing pipe installation on low pressure steam boilers.



No. 101 Electric Water Feeder— operated by No. 67 or liquid level switches.



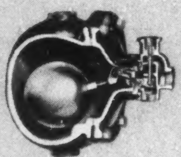
No. 63 Low Water Fuel Cut-off — for heating boilers up to 50 lbs. pressure.



No. 21

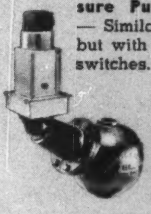
No. 121

No. 221



No. 27

Make-up Water Feeders — to maintain adequate water supply in receiving tanks. Nos. 21, 121 and 221 are installed right in tank openings; available in various flange forms and sizes as shown to fit existing openings. No. 27 is for external application, with equalizing piping.



No. 154 High Pressure Pump Control — Similar to No. 150, but with open contact switches.

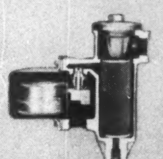
No. E-2 Flow Switch — Completes (or breaks) circuit when flow starts or stops.

No. 18 Float Valve — for maintaining water level in humidifier pans and many other liquid level control jobs. Also available in float chamber with cover, as No. 518.

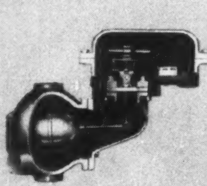
No. 80 Switch — Three wire high- or low-level alarm or pump control on oil storage tanks.

No. 230M-2 — Manifold series pressure relief valve for large hot water boilers. Btu-rated. ASME standard.

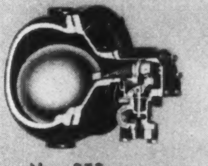
No. 230 Series Pressure Relief Valves—for hot water boilers and hot water tanks. Btu-rated. ASME standard.



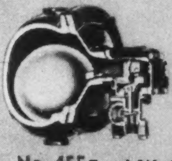
No. L-8 Constant Level Valve — maintains constant fuel oil pressure on burner.



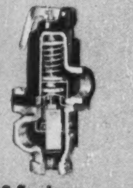
No. 65 Explosion-proof Electric Controller — Underwriters' approved for hazardous locations.



No. 355 Large Capacity Float Valve—has many uses on tanks, stills, receivers, etc.



No. 455 Feed Water Controller — for multiple boiler jobs, to divert pump discharge into proper boiler.



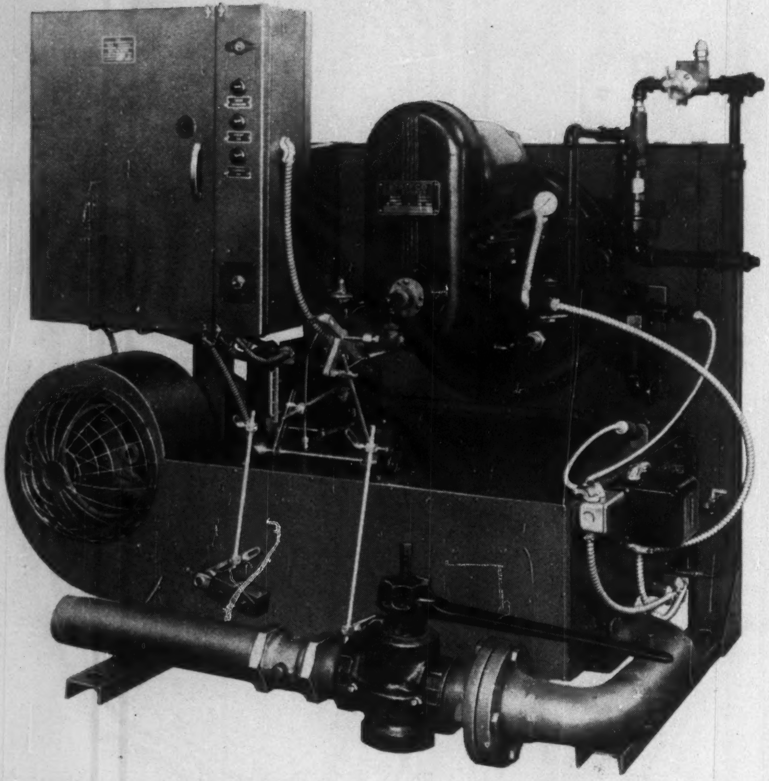
202 Series Combination T & P Relief Valves—for hot water tanks and heaters. AGA rated.

No. 201 Temperature Relief Valve—for hot water tanks and heaters. AGA tested, rated and listed.

Printed in U.S.A.

WEBSTER ROTONETIC*

- √ Sizes from 75 to 300 horsepower.
- √ Minimum gas pressure requirements.
- √ Low installation costs.
- √ Maximum efficiencies on BOTH gas and oil.
- √ Minimum base height requirements.
- √ Utilizes all grades of fuel oil.
- √ Extremely low noise level.
- √ Approved electronic combustion safeguard system.
- √ Simpler changeover than ever before.
- √ One hundred per cent forced draft.
- √ Completely assembled, piped, wired and tested.



DUAL FUEL FIRING BURNER

These and many other outstanding features combine to provide the same dependable high quality performance as the WEBSTER DYNETIC gas burner. Neither fuel must suffer if the WEBSTER ROTONETIC is used. With integral pumps, integral oil preheaters for heavy oils, patented oil burner "flame-shaping" vanes, and full modulating or optional high-low control, the WEBSTER ROTONETIC is designed to provide long lasting customer satisfaction the year around.

It is furnished with a precast refractory front as an integral part of the burner assembly. The installer need only finish the furnace wall on each side and above the burner.

*TRADE MARK

Listed by Underwriters' Laboratories, Inc.

The WEBSTER ENGINEERING COMPANY
TULSA, OKLAHOMA
Division of SURFACE COMBUSTION CORPORATION, Toledo, Ohio

TO CONSOLIDATE YOUR PURCHASES
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Put your TUBE TURNS' Distributor on your buying team and deal with one man instead of many . . . place one order rather than several. When it comes to welding fittings and flanges, your TUBE TURNS' Distributor can fill all your requirements. That's because TUBE TURNS, INC. offers industry's broadest line of welding fittings and flanges, covering over 4000 different items, in a complete range of types, sizes, and alloys.

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OIC Valves

...THE MODERN LONG LINE

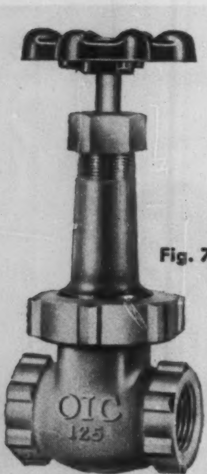


Fig. 7100

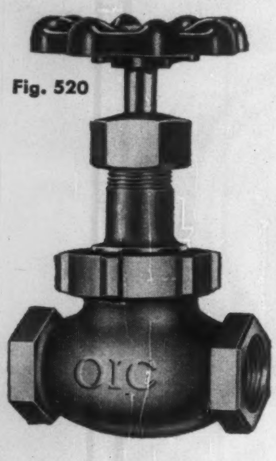


Fig. 520

BRONZE

⅛" to 3". 125, 150, 200, 300 and 350 WSP; 300A; 200, 400, 2,000 and 2,500 WOG.

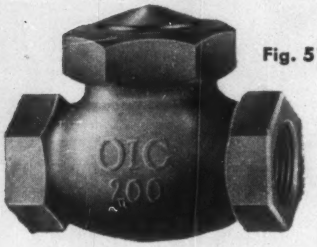


Fig. 516

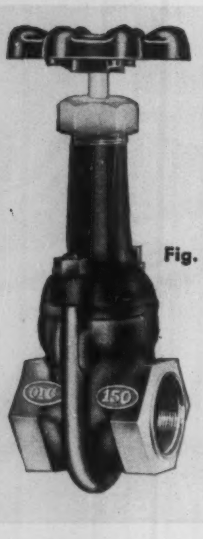


Fig. 333

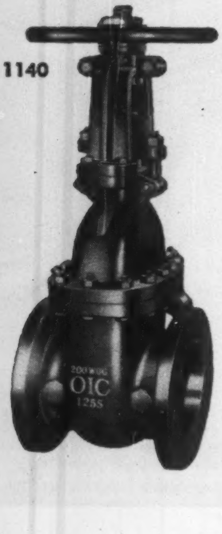


Fig. 1140

IRON

1¼" to 16". 125, 150 and 250 WSP; 175, 200, 400 and 500 WOG. ¼" to 4" DUO-BOLT Gates.

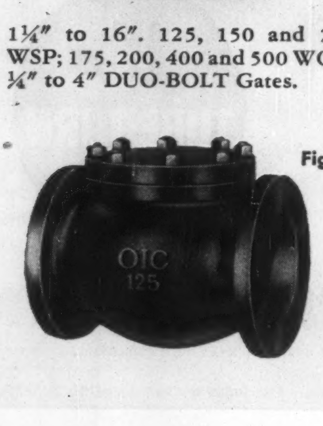


Fig. 124

CAST STEEL

2″ to 16″. 150, 300 and 600 lb. primary pressure series.

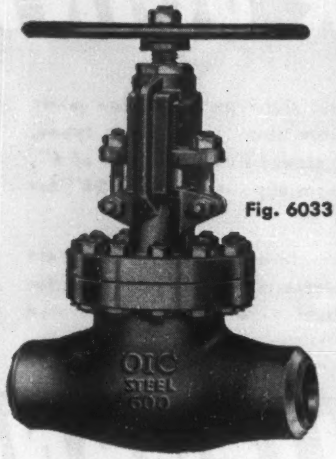


Fig. 6033

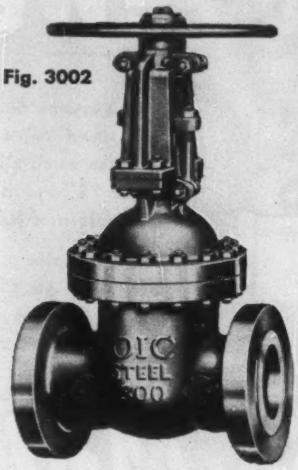


Fig. 3002

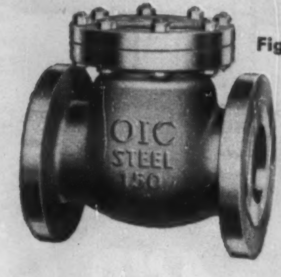


Fig. 1572

FORGED STEEL

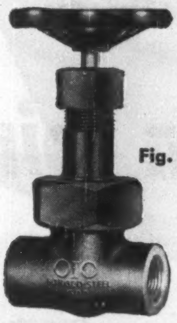


Fig. 1021

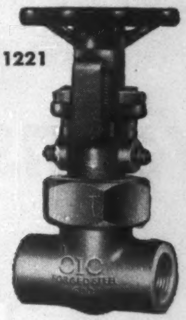


Fig. 1221

¼″ to 2″ Gate, Globe, Angle, Check Valves; 600 lb. primary pressure series.

STAINLESS STEEL

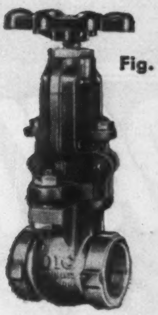


Fig. 810

Fig. 815

½″ to 2″. Gate valves, 200 lb. primary pressure series.

LUBRICATED PLUG

Fig. 10

1″ to 24″. Iron . . . 175 psi to 800 psi working pressures. Cast Steel series 150 lb.-230 psi, 300lb.-600 psi and ASA 150lb. class.

Contact your authorized OIC Distributor

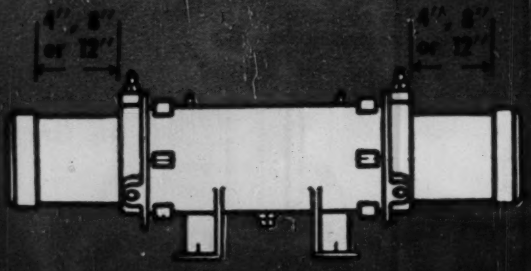
OIC
FOUNDED 1883

Write for the OIC Catalog Digest for quick valve selection.

THE OHIO INJECTOR COMPANY

WADSWORTH, OHIO

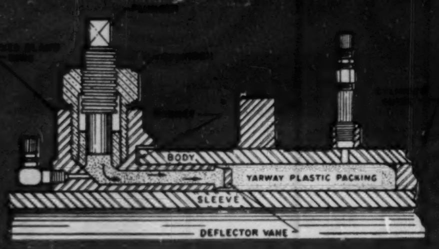
YOU NEED FEWER JOINTS



With Yarway Gun-Pakt slip-type expansion joints you need fewer joints than with other types, because each sliding sleeve has a traverse of 4", 8" or 12" . . . maximum expansion being 24" for a double-end joint.

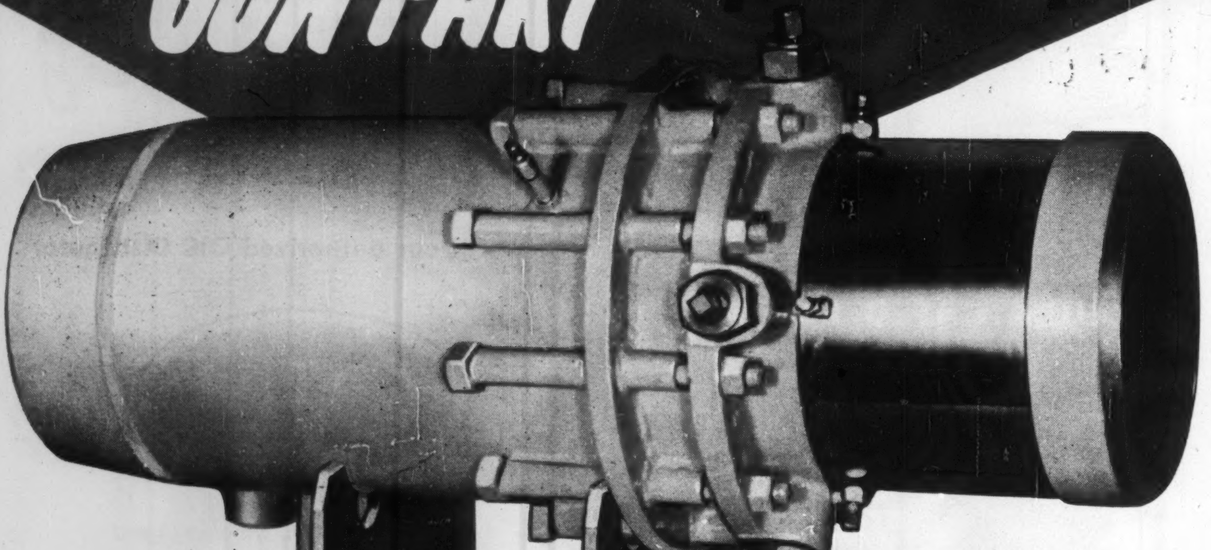
For example, one single-end Yarway Gun-Pakt joint with an 8" traverse is all that is needed for a 200 ft. run of steel pipe carrying saturated steam at 250 psi.

AND LESS MAINTENANCE



No need for shutdowns. Yarway Gun-Pakt Joints are serviced under full steam pressure. Just insert a plug of Yarway plastic packing, twist a wrench and the job is done. Maintenance and production manhours are saved!

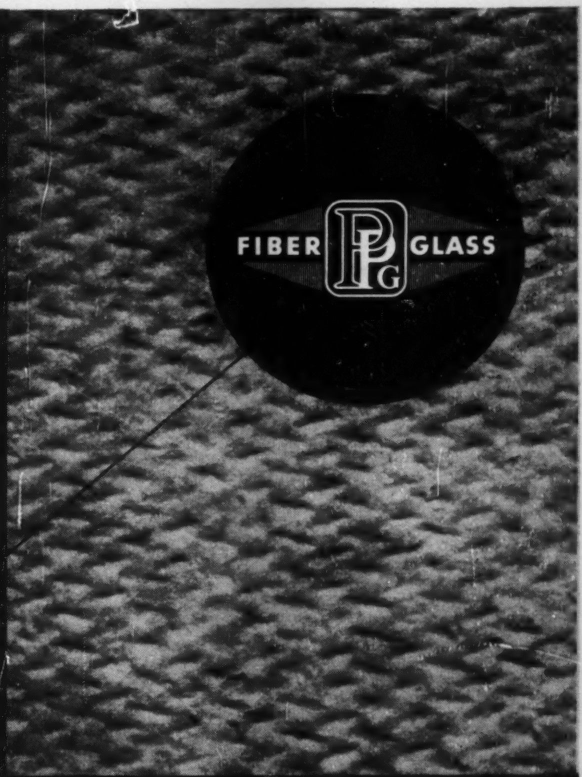
with GUN-PAKT expansion joints



Leading central heating stations, institutions and industrial plants use and *recommend* Gun-Pakt Expansion Joints. For the full Gun-Pakt story write for Bulletin EJ-1912.

YARNALL-WARING COMPANY
107 Mermaid Ave., Phila. 18, Pa.

YARWAY GUN-PAKT EXPANSION JOINT



The ductwork insulation that goes on fast . . . lowers insulation costs!

PPG Superfine Fiber Glass is today's most versatile hot or cold duct insulation. It combines higher insulating value than most other commonly used materials with complete ease of cutting and wrapping. Its high insulating and sound absorbing efficiency usually means a lesser thickness of PPG Superfine will do the job.

Because it is so easy to handle, PPG Superfine goes up fast . . . cuts labor costs. From the chart at the right, select the specification which exactly fits your need.

For complete buying information or technical assistance on your particular insulating problem, write to our executive offices or district sales offices in Chicago, Cincinnati, Cleveland, Detroit, New York or Washington. Pittsburgh Plate Glass Company, Fiber Glass Division, One Gateway Center, Pittsburgh 22, Pa.

Type	Density (lbs. per cu. ft.)	Thickness (Inches)	Approx. Sq. Ft. Per lb.	Typical Roll Lengths (Feet)	Approx. O.D. of Rolls (Inches)
S-314	0.6	½	40	100	17
		¾	26.7	100	21
		1	20	100	24
		1½	13.3	100	30
		2	10	100	35
		3	6.7	100	42
S-315	0.75	¼	64	100	12
		½	32	100	17
		¾	21.3	100	21
		1	16	100	24
		1½	10.7	100	30
		2	8	100	35
		3	5.3	50	30
S-316	1.0	¼	48	100	11
		½	24	100	16
		¾	16	100	20
		1	12	100	23
		1½	8	100	27
		2	6	100	32
		3	4	100	39
S-317	1.5	¼	32	100	11
		½	16	100	16
		¾	10.7	100	20
		1	8	100	23
		1½	5.3	100	27
S-318	2.0	¼	24	100	14
		½	12	100	19
		¾	8	100	24
		1	6	100	29
		1½	4	50	24
S-319	3.0	¼	16	100	19
		½	8	100	26
		¾	5.3	100	33
		1	4	50	20

ROLL WIDTHS—Pittsburgh Superfine is available in standard roll widths of 18", 24", 36", 48", 54", and 72" and can be supplied in any desired slit width down to 2". Rolls are wound on 2" tubes and wrapped in heavy Kraft paper.

SPECIAL FACINGS—Facings, such as reinforced duplex Kraft, reflective surfaced reinforced duplex Kraft, Aluminum Foil (.0025, .0007, .001), Aluminum Vinyl Film, Aluminum Foil on Paper, Asbestos Paper, Muslin and Cotton, and Vinyl Coating, can be furnished on request.

FIBER PPG GLASS

PAINTS · GLASS · CHEMICALS · BRUSHES · PLASTICS

PITTSBURGH PLATE GLASS COMPANY

BRIEFS from The YEOMANS GUARD

A Series of

"Glidden St. Louis Plant enjoys flood immunity"
"Operating every day for over 50 years, pneumatic ejector still going strong"
"Multi-dollar bargain for Dime Building"
"New development cuts service needs of wet-pit centrifugal pumps by 90-95%"

. . . punch-lines like these are a tip-off to the news you can expect in this series of advertisements (this is No. 1) in *Heating, Piping and Air Conditioning.* HP&AC readers . . . even many who have been specifying Yeomans Pumps as long as they can remember . . . will find this series useful as a source of news and ideas on pump selection, application and maintenance. These messages will prove interesting also to those who have had no previous acquaintance with Yeomans products, and who will benefit from knowledge of Yeomans thorough and resourceful engineering and high standards of conscientious service.

The YEOMANS GUARD
The YEOMANS GUARD
The YEOMANS GUARD

The Yeomans Guard—Full of interesting, specific facts about pump selection, applications and maintenance—free on request.

Yeomans "Briefs" are digests of material published in our periodical *The Yeomans Guard* and in Yeomans technical bulletins. Copies on request.

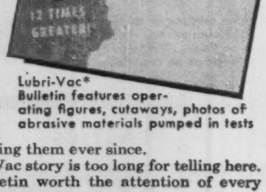
Makes Pumps Last 12 Times as Long . . .

Any device that multiplies the life of mechanical equipment by 12, rates "time out" for study. "Lubri-Vac," one of our own developments, does just that for vertical wet pit centrifugal pumps—

- by providing positive lubrication of the radial bearing, Lubri-Vac has reduced bearing failures and pump servicing by 95% —

which you'll agree is a remarkable achievement.

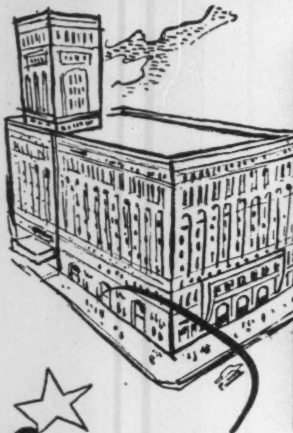
The "Lubri-Vac" feature has greatly broadened the market for the vertical wet-pit pump, noted for its efficiency and durability. Our figures are based on a three-year analysis of field reports. We claim to be authorities—because Yeomans designed the first vertical wet-pit pump ever built, and has been building them ever since.

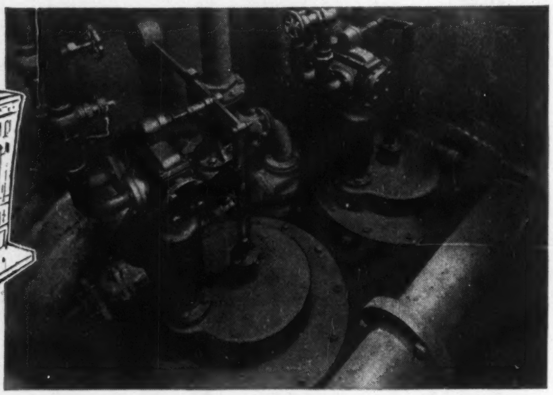


Lubri-Vac* Bulletin features operating figures, cutaways, photos of abrasive materials pumped in tests

This Lubri-Vac story is too long for telling here. There's a bulletin worth the attention of every pump user—sent on request.

*Lubri-Vac is a Yeomans Tradename





Stars Still Scintillate in Chicago's Auditorium . . . *in the basement!*

For the galaxy of VIP's who "slept here," and of world-famous voices that thrilled from its operatic stage, few buildings can match Chicago's Auditorium Hotel and Theatre—two buildings in one, erected in 1889.

Below-stairs are two more "stars" that still perform with flawless perfection: two Shone® Pneumatic Ejectors, one in each building—installed in '89.

In 1946, when this honored edifice was thoroughly inspected preparatory to becoming Roosevelt College, the two Shones were found in excellent condition and well able to continue. They're still doing their stuff—quietly, rhythmically. Can you think of any mechanical device with a performance record approaching that of the Shone? Neither can we.

® Registered

NEW MODERATELY PRICED BILGE PUMP SOLVES MANY "LIGHT-HEAVYWEIGHT" PROBLEMS

A new centrifugal wet-pit drainage pump for capacities up to 120 g.p.m. and heads up to 46 feet has been developed to bridge the gap between the Yeomans "Drain-Dri" cellar drainer and the Yeomans Series 3000 Heavy Duty Bilge Pump.

The new model Series 3100 is designed for residential and business buildings, industrial and utility plants, sewage and water treatment plants, parks, pools and similar installations.

Advantageous features include heavy construction, higher heads at low capacity with less horsepower, and engineering service on pump installation. Bulletin 3102 is available on request.

. . . and Pittsburgh's Mellon Bank has a FINANCIAL GENIUS *in the basement!*

Not all the investment wizardry and financial acumen of the Mellon National in Pittsburgh is limited to the spacious dignity of executive offices.

Down in the basement, unseen and unsung, is a faithful worker with as canny a sense of money, as sound a judgment of investments as you'll find top-side: A Yeomans Sump Pump installed in 1922. It handles the cooling water from the air conditioning system, and the drainage normal to any big building.

For 31 years that pump tended to its job—never got out of the pit; until the engineer decided it might be well to inspect it, before another summer with its peak load on the air conditioning equipment.

Isn't that the kind of faithful performance you hope to get from any mechanical equipment? There's a sure way to get it.

Send for Bulletin 3-8001.

Messages About Pumps and Pumping for the Readers of Heating, Piping and Air Conditioning

CENTRIFUGAL PUMP OR PNEUMATIC EJECTOR? . . . *Yeomans Can Recommend Either*

When you submit to Yeomans any problem of handling material by pumping it, you can be entirely sure that you'll get an unbiased recommendation—as to centrifugal pump or pneumatic ejector.

Yeomans engineering attention focuses on the character of material to be pumped and on other technical aspects of the job to be done—in order to determine which type of equipment will perform most efficiently, dependably and at lowest cost.

This claim of objectivity is, to be sure, common to practically all equipment manufacturers; but here it has added significance because Yeomans builds both centrifugals and pneumatics.

In all other respects, a Yeomans recommendation is enthusiastically biased—because we are utterly convinced that Yeomans Pumps—either centrifugals or pneumatics are the best pumps built!

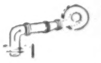
MAINTENANCE BRIEF

It's Healthy for Suction Piping to get a "Good Slant on"

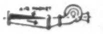
Here are two basic facts to remember about suction piping:

1. Horizontal piping should slope upward toward the pump
2. Any reducer which connects between pump and pump intake nozzle should be horizontal at the top . . . eccentric, not concentric.

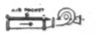
Like this:



Right way—
Up-sloping pipe and reducer horizontal at top prevent air-pocketing



Wrong way—
Down-sloping pipe creates air-pocket



Wrong way—
Tapered reducer not horizontal at top creates air-pocket

An air pocket is bad news—the air may easily be sucked into the pump: causing loss of suction, which seriously endangers the pump.

Three good items to check:

√ Check suction piping in present system—correct any down slope toward pump.

√ Check coupon and mail to us for Centrifugal Pump Maintenance Manual 2000—a money-saver!

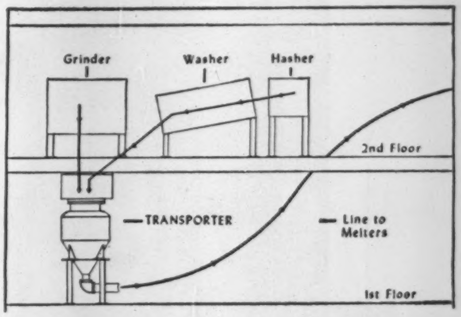
√ Check coupon and mail to us for Manual 1112—has full information on Yeomans Centrifugals.

Another Way to Pump Those "Unpumpable" Bulk Items

Have you a pet "nuisance" in your plant?—some hard-to-handle item that is costing you money and sleep! Take a firm, careful look at the "Transporter"—that amazingly simple, hard-working Yeomans unit that is performing low-cost miracles! "Transporter"* is a pneumatic ejector with no working parts, nothing to clog, safe, needs no attention or service.

It can handle heavy bulk materials such as:

- wastes—in packing houses, canneries, tanneries, etc.
- pulp and paper materials
- foundry sand, ashes, powdered coal
- sludge, screenings and the like
- construction material



This flow diagram shows how a meat packer solved a problem of handling difficult materials—hashed and washed offal, shredded carcasses and bones, warm fats and trimmings and paunch contents

Why not give your local Yeomans representative a drawing or sketch of your set-up and mention the kind and quantity of material to be handled. Or write us for bulletin. Use the coupon.

*Transporter is a Yeomans Tradename

A COMPETENT MAN ON PUMPS . . . the Yeomans REPRESENTATIVE

When you are in the market for a pump, you want and welcome the counsel of a man who not merely knows pumps but who is trained to *understand the problem you expect the pump to solve.*

You'll find your local Yeomans representative just the man you're looking for. He operates, or is a member of, his own business. He handles several excellent lines of equipment in the same market category as Yeomans Pumps. As a rule, he has an engineering degree—in some instances he's a capable "engineer by osmosis." In any case, he's a good business man, fully qualified to analyze a problem and to recommend a practical solution.

You'll find him listed in the Classified Directory under "Pumps"—a good man to know.

YEOMANS BROTHERS COMPANY
2000-5 N. Ruby Street, Melrose Park, Illinois

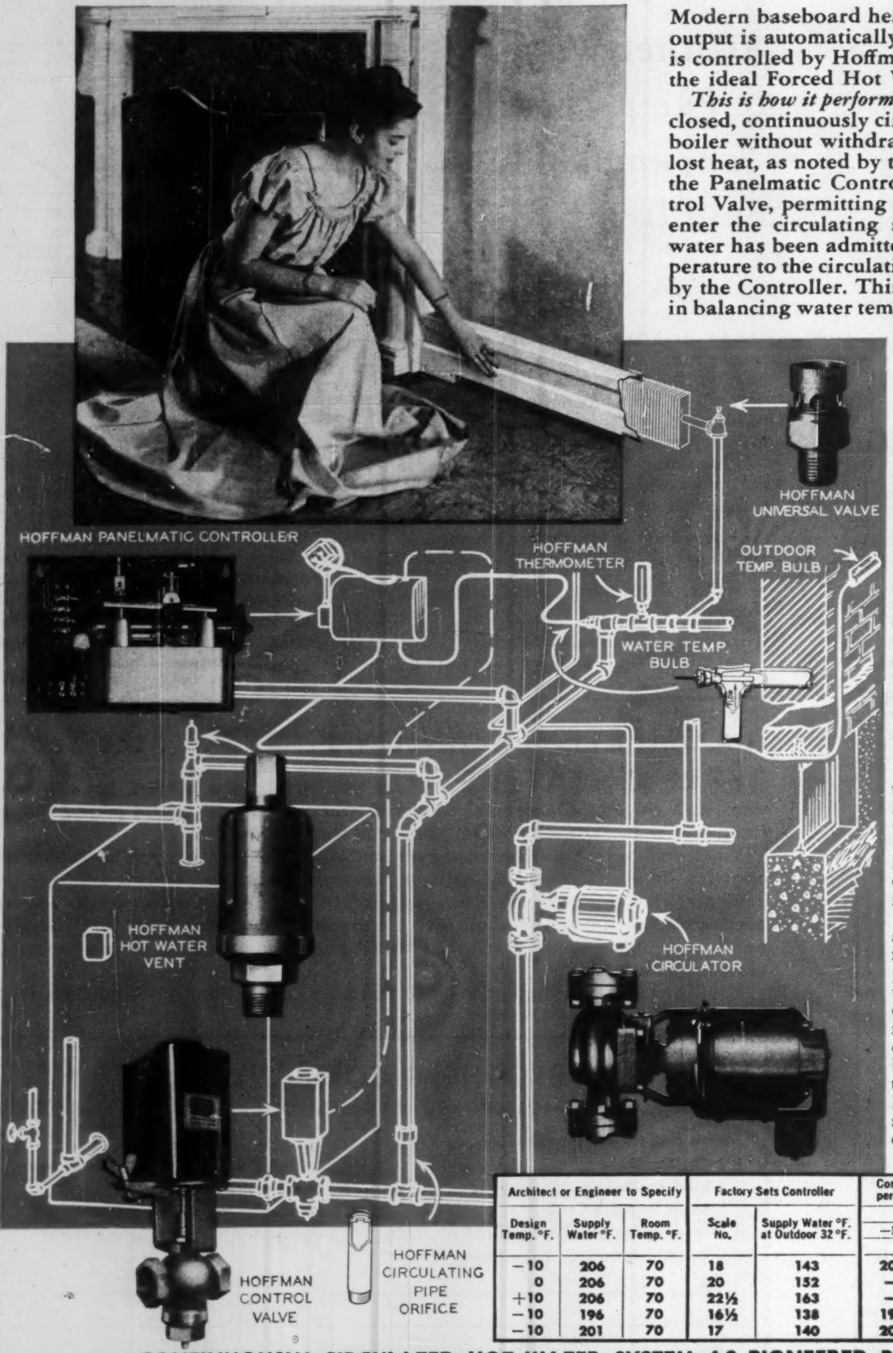
Please send me without obligation . . .

☐ The Yeomans Guard
☐ Lubri-Vac Bulletin
☐ Shone Ejector Bulletin
☐ Shone Ejector Installations List
☐ Bulletin 3102—New Bilge Pump
☐ Bulletin 3-8001—Wet-Pit Centrifugals
☐ Maintenance Manual 2000
☐ Manual 1112—Full line of Centrifugals
☐ Transporter Pneumatic Ejector Bulletin

Name____________________ Title____________
Company______________________________
Address______________________________
City________________ Zone____ State________

HOFFMAN PANELMATIC TEMPERATURE CONTROLLER

Automatically Balances Baseboard Water Temperature with Weather



Modern baseboard heating is at its best when heat output is automatically balanced with weather and is controlled by Hoffman matched specialties, as in the ideal Forced Hot Water System shown below.

This is how it performs: When the Control Valve is closed, continuously circulating water by-passes the boiler without withdrawing heat. When water has lost heat, as noted by the Water Temperature Bulb, the Panelmatic Controller slowly opens the Control Valve, permitting hot water from the boiler to enter the circulating stream. When sufficient hot water has been admitted to restore the proper temperature to the circulating water, the Valve is closed by the Controller. This cycle repeats automatically in balancing water temperature to weather changes.

Designed especially for AUTOMATIC HOT WATER

The Hoffman Panelmatic Controller is based on the fact that for every Outdoor Temperature there is a corresponding Supply-water Temperature, which must be *automatically maintained* in the heating units. The correct Supply-water Temperature, or the output per sq. ft. EDR, must be specified by the Architect or Engineer for *one Outdoor Temperature.* The Controller then automatically adjusts the Water Temperatures to balance any other outdoor conditions encountered. The table below illustrates several sets of conditions for baseboard heating systems.

When the outdoor temperature reaches 65° F., the Circulator automatically stops. The 65° factory setting was chosen because it is the basis for calculating degree days. If a different cut-out temperature is desired, it can be easily adjusted to individual requirements. Occasionally the actual heat loss differs from the calculated loss due perhaps to changes in construction. The Panelmatic Controller can be easily re-adjusted after installation according to simple, definite instructions furnished by the factory. Technical literature describing the Hoffman Panelmatic System and sample specifications, gladly furnished on request.

Architect or Engineer to Specify			Factory Sets Controller		Controller Automatically Furnishes Supply Water at Temperatures Correct for Any Outdoor Temp. as Listed Below				
					Outdoor Temperature °F.				
Design Temp. °F.	Supply Water °F.	Room Temp. °F.	Scale No.	Supply Water °F. at Outdoor 32 °F.	−10	0	+10	+30	+50
					SUPPLY WATER TEMPERATURE °F.				
−10	206	70	18	143	206	191	176	146	116
0	206	70	20	152	—	206	189	155	121
+10	206	70	22½	163	—	—	206	167	128
−10	196	70	16½	138	196	182	168	140	113
−10	201	70	17	140	201	187	172	143	114

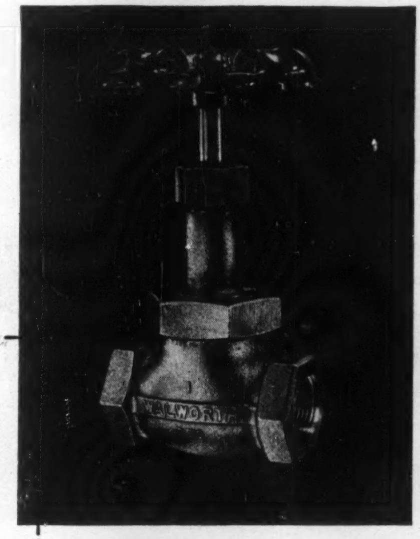
CONTINUOUSLY CIRCULATED HOT WATER SYSTEM AS PIONEERED BY HOFFMAN

HOFFMAN SPECIALTY MFG. CORP. • 1001 York Street, Indianapolis 7, Indiana

Makers of Valves, Traps, Hot Water Heating Systems, Vacuum and Condensation Pumps — Sold by Leading Wholesalers of Heating and Plumbing Equipment

WORTH
No. 225P

IDENTIFICATION DISC: An aluminum marking plate on all Walworth No. 225P's facilitates inventory control and makes reordering quick and positive.



take a good look at the Walworth "500 Brinell" no. 225P Globe

NEWLY DESIGNED HANDWHEEL: Patented air-cooled, finger-fit handwheel affords sure grip even with greasy gloves.

– the Toughest Bronze Valve Your Money Can Buy

The stainless steel, corrosion resistant seats and discs are heat treated to a hardness of 500 Brinell – hard enough to scratch glass and crush nails! The valve can be closed on sand, slag, and pipe scale without injury to the seating surfaces. "Wire drawing" is practically eliminated. All parts are accurately machined and gaged. Years of tight, positive shut-off are assured.

Available in both globe and angle types (angle type: No. 227P) in sizes ¼" to 2", this quality valve is recommended for 350 lbs. W.S.P. at 550 F, and 1000 lbs. non-shock service on cold water, oil, gas, or air.

For full data on this long-life, economical Walworth Bronze Valve, see your local Walworth distributor, or write for Circular.

IMPROVED PACKING: Molded packing of lubricated asbestos reinforced with copper wire. Suitable for practically every service. Valves can be repacked under pressure when fully opened.

note these 7 Great Features

HEXAGONAL UNION BONNET CONNECTION, DEEP STUFFING BOX AND RUGGED STUFFING NUT: Union bonnet connection eliminates any chance of distortion or leakage even though valve is repeatedly taken apart and reassembled.

OVERSIZE STEM: The high-tensile strength silicon-bronze stem assures long life and protection against wear.

SEATS AND DISCS: Plug type seats and discs of stainless steel, heat-treated to 500 Brinell hardness and machined simultaneously to a mirror-like finish, with accurate tapers assures tight positive shut-off with minimum handwheel effort.

WALWORTH
350

EXTRA STRONG BODY: Made of Composition M (ASTM B61) bronze. Thick walls and rugged hexes provide a high safety factor. Valves undergo hydrostatic shell test of 1,000 psi.

WALWORTH
valves and fittings
60 EAST 42nd STREET, NEW YORK 17, N. Y.

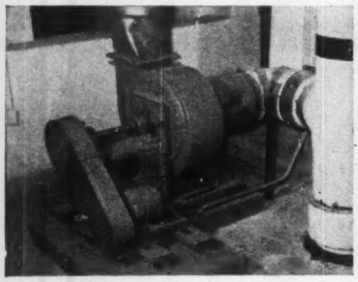
Wyandotte Chemicals Research Bldg. Architect: Stanton & Hillier. Consulting Engineer: George Wagschal Assoc. Contractor: Walbridge-Aldinger Co.

Better Air

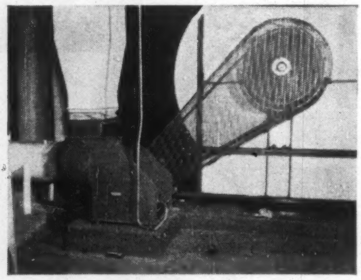
for tomorrow's chemical research

Air — the right kind of air, properly cleaned, conditioned and humidified — is a vital necessity in a modern chemical research laboratory. That's why Wyandotte Chemicals Corp. chose American Blower equipment for their highly functional new research building which has complete air conditioning in every laboratory. American Blower engineers have a complete knowledge of the air cycle and the special problems of many industries. Whenever you have an air handling problem give your nearest American Blower or Canadian Sirocco Branch Office a call.

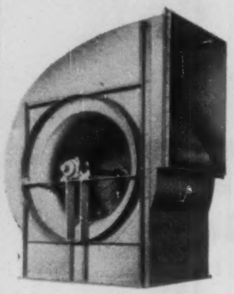
Wyandotte Chemicals Corp. chooses American Blower equipment for new multi-million dollar research building



Individual laboratory exhaust fans (rubber covered and corrosion resistant) have two speeds: slow for normal exhaust; high for experimental work. This allows the chemist to completely control room and hood ventilation.



Secondary air is supplied by an American Blower HS fan with humidifier and dehumidifier, heating and cooling coils. Fan in foreground is American Blower utility set used to ventilate hard-to-reach areas such as stairways, etc.



American Blower Series 81 Sirocco Fan. All Sirocco Fan ratings are certified in accordance with the Standard Test Code.

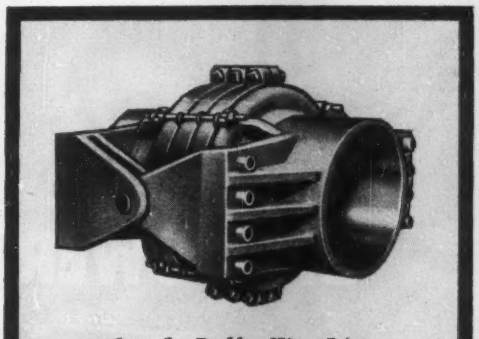
AMERICAN BLOWER CORP., DETROIT 32, MICH. • CANADIAN SIROCCO CO., LTD., WINDSOR, ONT.

Division of American Radiator & Standard Sanitary Corporation

AMERICAN BLOWER

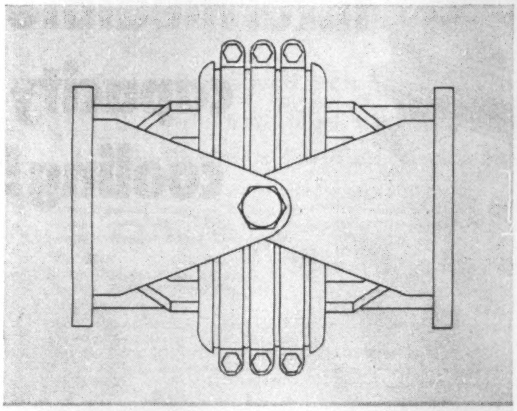
Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS • SUNBEAM AIR CONDITIONERS

PIPE EXPANSION...?



Corruflex Packless Hinge Joint

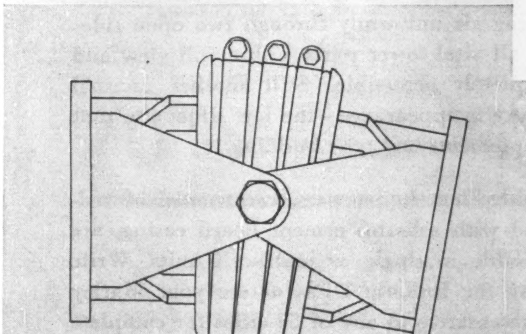
ADSCO HAS THE JOINT

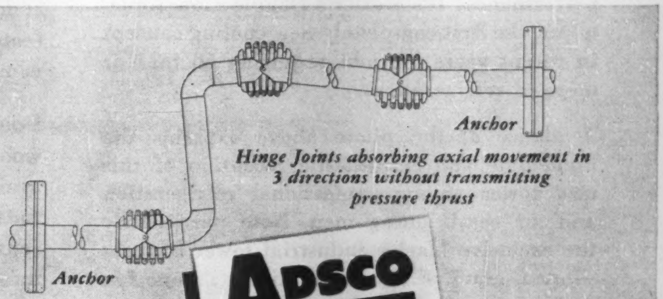


Hinge Joint in straight position

● Because ADSCO makes the world's most complete line of slip and packless expansion joints, it has exactly the right joint to fill each need ... The Corruflex Hinge Joint illustrates just one type of ADSCO's packless expansion joints. This joint permits movement in one plane by rotating about its own hinge-pin axis. In the application shown below, Hinge Joints are used to permit the pipe line to expand in three directions without transmitting line pressure thrust to anchors and without causing excessive stresses in the piping. This is a distinct advantage in elevated pipe lines or in cases where there is no structure strong enough to provide for end-anchor thrust ... But the Corruflex Packless Hinge Joint is only one joint in ADSCO's complete line of slip and packless expansion joints. Whatever the problem, call an ADSCO representative first ... or write for Bulletin 35-51A.

Hinge Joint in angular position as a result of pipe line expansion





Hinge Joints absorbing axial movement in 3 directions without transmitting pressure thrust

ADSCO ENGINEERED PRODUCTS

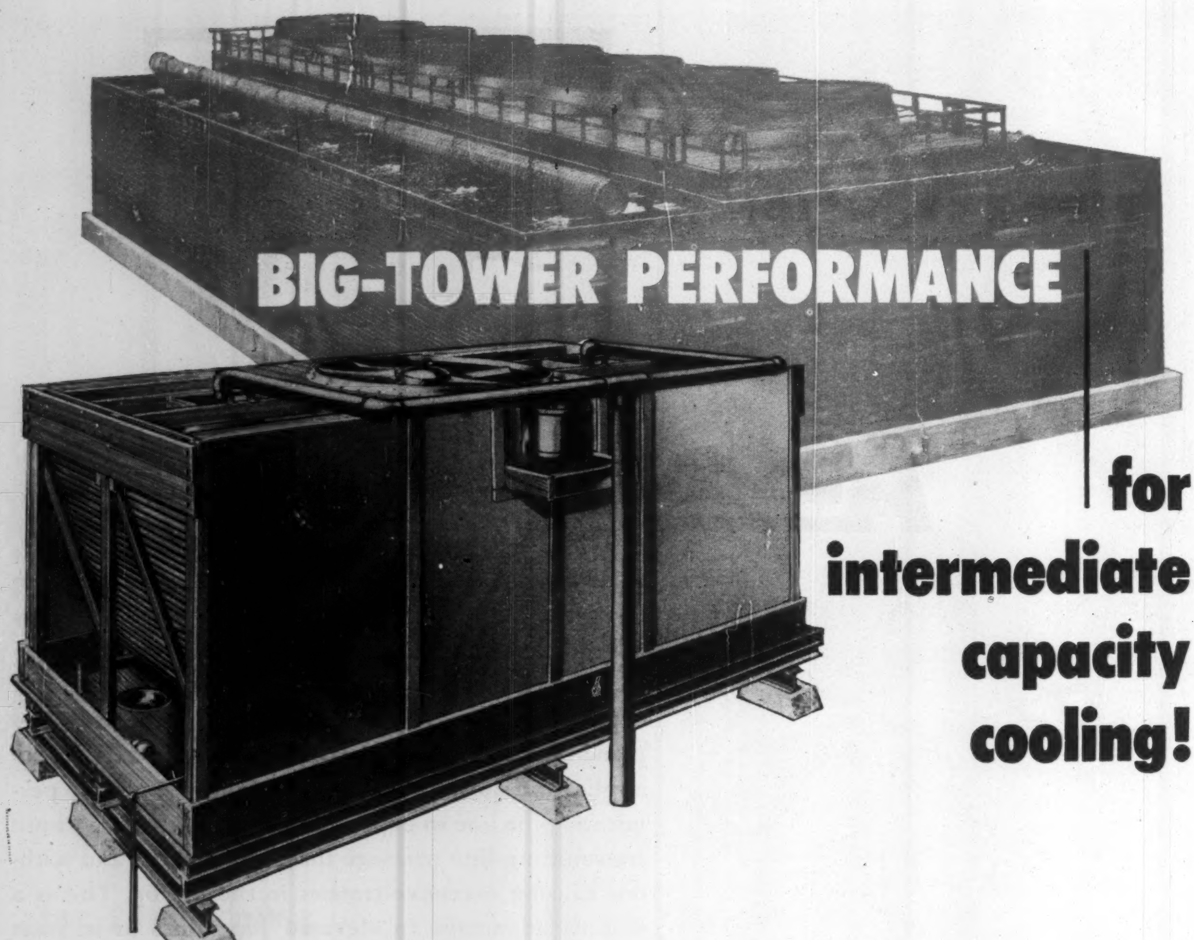
EXPANSION JOINTS
HEAT EXCHANGERS
STEAM TRAPS

STRAINERS
SEPARATORS
METERS

AMERICAN DISTRICT STEAM COMPANY, INC.

NORTH TONAWANDA, NEW YORK

Since 1877



BIG-TOWER PERFORMANCE for intermediate capacity cooling!

MARLEY Double-Flow Aquatower*

There's only *one* cooling tower in the intermediate-capacity range that delivers *big-tower* performance! It's Marley's Double-Flow Aquatower, the first completely new cooling concept in recent years for jobs requiring 50 tons or more of refrigeration.

A glance at the photo above explains the immediate and enthusiastic reception of this new tower among professional refrigeration and air conditioning men. Note particularly the exclusive Marley industrial tower features —open, gravity-flow distribution . . . one fan pulling air uniformly through two open sides . . . all vital tower parts within full view and completely accessible. Still another unusual feature is appearance—the low silhouette that complements any type building.

Double-Flow Aquatowers, constructed of redwood with asbestos cement board casing, are available in single or multi-cell units. Write today for Bulletin DFA, or see your Marley representative in any of 50 cities for complete information.

*Registered Trademark

MARLEY ®

The Marley Company

Kansas City, Missouri

Motor Repair Service Wherever You Are

ALLIS-CHALMERS
"Certified"
SERVICE

Factory approved motor service in every industrial area from 101 Allis-Chalmers Certified Service Shops.

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Mt. Vernon—Dowzer Electric Machinery Works, Inc.

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Sioux City—Smith Elec. & Supply Co.

KANSAS
Salina—Cent. Kans. Elec. Mach. Co.
Wichita—Tarrant Electric Mach. Co.

LOUISIANA
New Orleans—Industrial Elec., Inc.
Shreveport—Shreveport Armature & Electric Works

MAINE
Brewer—Stanley J. Leen Co.

MARYLAND
Baltimore—Keystone Electric Co., Inc.

MASSACHUSETTS
Lawrence—Roland B. Glines Co.
Springfield—Elec. Motor Repair Co.

MICHIGAN
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Grand-Rapids—Grand Rapids Industrial Electric Co.
Saginaw—Banning Elect. Prod. Corp.

MINNESOTA
Duluth—Mielke Electric Works, Inc.
Minneapolis—Parsons Elec. Co.

MISSISSIPPI
Vicksburg—Ludke Electric Co., Inc.

MISSOURI
Kansas City—Boese-Hilburn Elec. Co.
St. Louis—French-Gerleman Elec. Co.
Springfield—Springfield Elec. Serv. Co.

NEBRASKA
Omaha—Omaha Electrical Works

NEW HAMPSHIRE
Concord—A. S. Tracy

NEW JERSEY
Atlantic City—Charles A. Buckley
Paterson—Elec. Service Repair Co.
Trenton—Lockwood Elec. Motor Serv.

NEW MEXICO
Albuquerque—Electric Motor Company
Powell Electric Co.

NEW YORK
Buffalo—Robertson Electric Co.
Volland Elec. Equip. Co., Inc.
Flushing—Flushing Elec. Corp.
Jamestown—A. E. Westburgh
Mt. Vernon—H. A. Schreck, Inc.
New York—Consol. Elec. Motor Co.
Rochester—Vanderlinde Elec. Corp.
Utica—Mather, Evans & Diehl Co.
Watertown—Watertown Elec., Inc.

NORTH CAROLINA
Charlotte—Southern Elec. Service Co.
Greensboro—Southern Elec. Serv. Co.
Rocky Mount—Hammond Elec. Co.

OHIO
Cincinnati—Cincinnati Elec. Equip.
Electric Service Co.
Akron—A-C Supply Co.
Toledo—Romanoff Elec. Motor Serv.
Youngstown—Winkle Electric Co.

OKLAHOMA
Miami—Miami Armature Works
Oklahoma City—Southwest Elec. Co.
Tulsa—Smith-Milligan Electric Co.

OREGON
Eugene—Kalen Electric & Mach. Co.
Portland—Milwaukee Mach. Co.

PENNSYLVANIA
Johnstown—Universal Elec. Mfg. Co.
Osceola Mills—Mid-State Elec. Eng. Co.
Philadelphia—Elec. App. & Repair Co.
Pittsburgh—Penn. Elec. Coil Corp.
York—Industrial Electric Company

SOUTH CAROLINA
Greenville—Southern Elec. Serv. Co.
Spartanburg—Southern Elec. Serv. Co.

SOUTH DAKOTA
Sioux Falls—Electric Motor Repair

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Columbia—Middle Tenn. Arm. Wks.
LaFollette—Standard Arm. Works, Inc.
Memphis—Indus. Elec. & Supply Co.

TEXAS
Amarillo—G. E. Jones Elec. Co.
Beaumont—Elec. Mach. & Repair Co.
Dallas—Industrial Elec. Equipment Co.
El Paso—B & M Machinery Co.
Fort Worth—Central Electric Co.
Houston—Roy A. Berentz Co.
Sweetwater—Sweetwater Electric Co.

UTAH
Salt Lake City—Diamond Electric Motor Repair

VIRGINIA
Richmond—Wingfield & Hundley
Roanoke—Virginia Armature Co.

WASHINGTON
Spokane—Lee F. Austin Company

WEST VIRGINIA
Charleston—Charleston Elec. Supply
Fairmont—West Virginia Armature Co. of Fairmont, Inc.
Morgantown—Galis Elec. Repair Co.

WISCONSIN
Baraboo—Utility Trans. & Equip. Co.
Green Bay—Beemster Electric Co.
Milwaukee—Dietz Electric Co.
Wausau—Electric Motor Service
Wisconsin Rapids—Staub's Elec. Wks.

ALLIS-CHALMERS CERTIFIED SERVICE SHOPS are independent service shops which have met rigid standards for ability, experience, equipment and business integrity. They use factory approved methods and parts and do your work promptly at a fair price.

Of course, Allis-Chalmers Certified Service Shops give good service on any electrical equipment, of any make. Save this ad, or write the name of the A-C Certified Service Shop nearest you in your address book. Allis-Chalmers, Milwaukee 1, Wisconsin.

A-4197

Texrope and Vari-Pitch are Allis-Chalmers trademarks.

ALLIS-CHALMERS

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Distributors, Certified Service Shops and Sales Offices throughout the country.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

TEXROPE — Belts in all sizes and sections, standard and *Vari-Pitch* sheaves, speed changers.

PUMPS — Integral types from ¾ in. to 72 in. discharge and up.

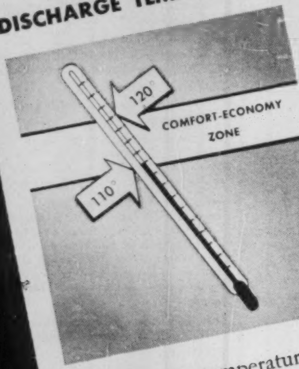
Before you buy any unit heater

Compare

MODINE STEAM and HOT WATER units that top the field

Compare

DISCHARGE TEMPERATURES

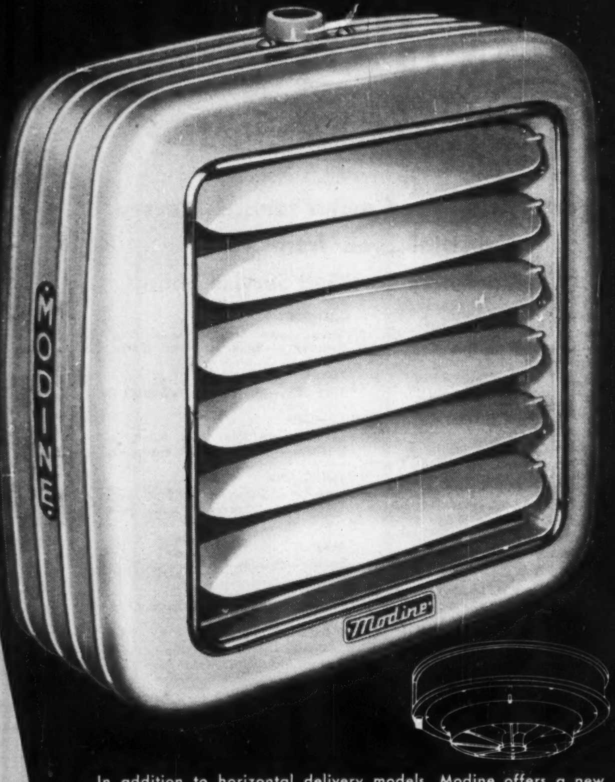


Discharge air temperatures of 110° to 120° F. are correctly related to air velocities — the key to perfect heating comfort plus lower fuel costs.

Compare

HEAT THROW

No one but Modine gives you a built-in velocity generator that effectively steps up heat throw, assures positive heat penetration of cold air strata near floor.



In addition to horizontal delivery models, Modine offers a new line of vertical units for both steam and hot water. New, improved design is lighter, smaller, yet gives you *greater* capacity.

Modine
UNIT HEATERS

Compare LONG LIFE

Modine's advanced engineering is combined with superb styling and highest grade materials. Your assurance of long years of trouble-free service. *But see for yourself!* Call the Modine representative listed in your phone book, or write for Bulletin 153 on Modine Steam and Hot Water Unit Heaters.

Modine

...steam, hot water or gas...

Modine WITH ALL OTHERS!

MODINE
Modine

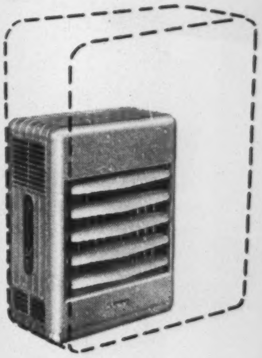
Modine Gas-Fired Unit Heaters are built in a full range of popular sizes. All are A.G.A.-approved for natural, mixed, manufactured, L.P. and L.P.-air gases.

GAS-FIRED units that top the field . . . with *stainless steel* heat exchangers and burners

Compare

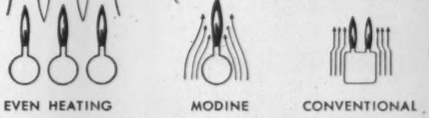
EASE OF INSTALLATION

Advanced stainless design makes Modines 50% lighter in weight—more compact than the average of seven other leading makes. Installation is faster, easier — no need for special structural supports. On one job, it cost the heating contractor $600 less to install 66 Modines than conventional units — savings he passed on to the owner.



Compare

PERFORMANCE



Not only do Modine units resist corrosion — all tubes heat uniformly because they're individually fired. Burners have elongated ports with four times the free area of ordinary drilled ports for maximum combustion efficiency. Remember: with Modines you are *sure* of getting full rated capacity.

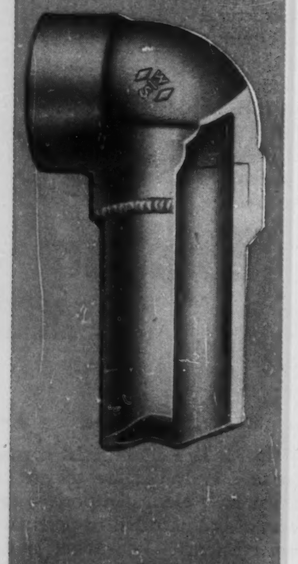
U-1202

Compare ALL-AROUND VALUES

As the leader in the development and application of steam and hot water unit heaters for more than 25 years, Modine brings unequalled experience to gas unit heating problems. It is the *only* manufacturer to publish heat throw data for gas-fired units. For facts, ask for Bulletin 653. Modine Mfg. Co., 1563 DeKoven Avenue, Racine, Wisconsin.

Modine
GAS FIRED
UNIT HEATERS

Half the Welding Skill is in the Fitting...



WATSON-STILLMAN FORGED STEEL SOCKET-WELDING FITTINGS make your pipe welding jobs easier three ways:

1. The fittings themselves support and align the pipe—no need for special fixtures or tack welding. Just slip the fitting over end of pipe and weld.

2. No chill rings are needed. Welding "icicles" can't form inside the pipe. Socket welding is actually lap welding—not butt welding.

3. Ample "come-and-go" in socket makes fussy accurate measurement and cutting of pipe unnecessary.

WATSON-STILLMAN FITTINGS are drop forged of highest quality steel to produce the well-known forged-fiber structure for maximum strength against pressure, temperature, shock and vibration. Extra strength is built-in in other ways, too—such as the extra reinforcement of long bands extending well beyond the bottom of the socket.

W-S SOCKET-WELDING FITTINGS are also available in forged stainless and alloy steels for exceptional service at high and low temperatures and for maximum resistance to corrosion. Write today for information.

Sold Through Leading Distributors

W S

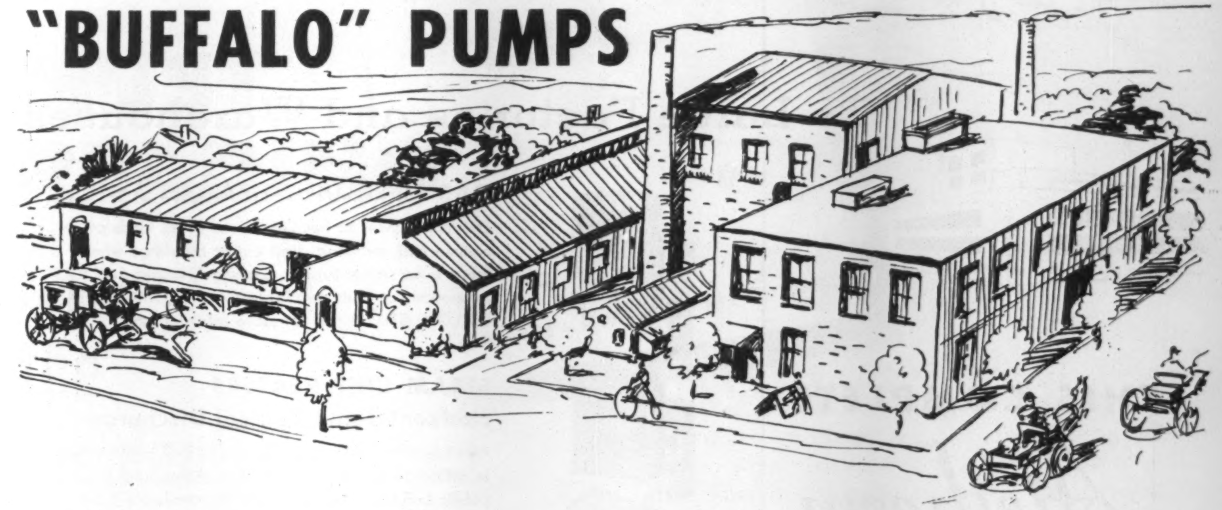
WATSON-STILLMAN

Forged Steel Fittings

Since "WAY BACK WHEN"...

Industry has depended on

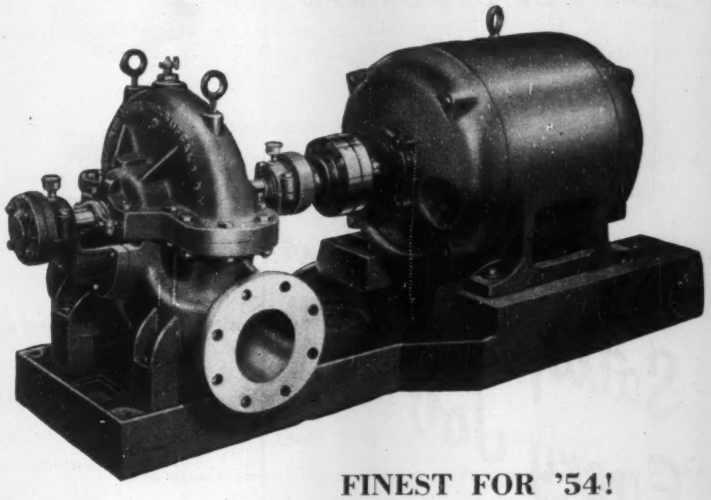
"BUFFALO" PUMPS



Long before electric motors, powered pumps, the then Buffalo Steam Pump Company was already building some of industry's most respected pumps. Respected, because "Buffalo" engineers and craftsmen started out to build pumps that *wouldn't* need a lot of attention and repairs — and would still be on the job twenty and thirty years later.

They've adhered to that idea ever since — passing their know-how on to their followers — always keeping close contact with requirements in the field — making never-ending improvements. Today, you can pick a "Buffalo" Centrifugal Pump with the full assurance that it embodies every known feature for the most efficient and trouble-free service possible.

Anyone can build a pump that will move a liquid. Yet, doesn't it make sense to buy the pumps of a manufacturer who has specialized in quality pumps, and pumps alone, since "way back when"?



FINEST FOR '54!

For handling clear water in capacities from 10 to 14,000 gpm, this Buffalo Type "SL" Double Suction Pump has no equal for efficiency, easy maintenance and long life. Widely used in power plants, air conditioning and air washer service, paper and textile mills. Write for Bulletin 955-P.

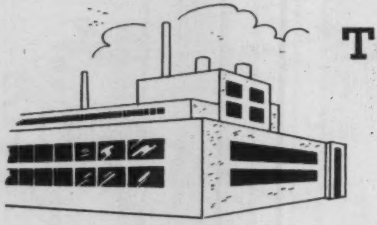
"Buffalo" PUMPS

BUFFALO PUMPS, INC.

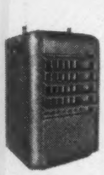
171 Mortimer St. Buffalo, New York
Subsidiary of Buffalo Forge Company
Canada Pumps, Ltd., Kitchener, Ont.
Sales Representatives in all Principal Cities.

A BETTER CENTRIFUGAL PUMP FOR EVERY LIQUID

From Small Homes and Offices

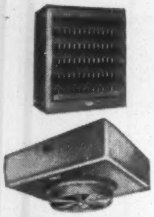


To Large Factories and Warehouses



GAS FIRED UNIT HEATERS

Efficient answer to heating needs in all kinds of commercial, industrial and public buildings where there is no steam supply. Compact, suspended, propellor fan units available from 25,000 BTU to 200,000 BTU. Write for more information.



STEAM UNIT HEATERS
Horizontal and Vertical Discharge

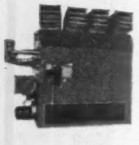
Flexible heating to fit a wide range of requirements in offices, factories, warehouses, stores and public buildings. Horizontal Units available from 18,600 BTU to 270,000 BTU. Vertical Units available from 32,300 BTU to 350,000 BTU. Write for Catalog 1209.

CONVECTORS

Outstanding for easy installation and long, trouble-free service. Clean, uncluttered design blends perfectly into both modern and traditional interiors. Available in a wide range of styles and sizes. Write for Catalog 702-A.

CENTRIFUGAL FAN UNIT HEATERS

Dual Purpose installation for both heating and ventilating can be easily made with this attractively designed unit. Specially desirable for industrial and commercial buildings, schools and auditoriums. Capacities up to 1,440,000 BTU. Available with dampers, filters and non-freeze coils. Write for Catalog 403.



DIRECT FIRED SPACE HEATERS

Self-Contained unit for direct firing with gas or oil or combination gas and oil with instantaneous change over. May be used as both heater and ventilator or heater alone. Comes equipped with motor, burner, heavy-duty combustion chamber, plus all safety devices. Capacities from 650,000 to 2,000,000 BTU. Write for Catalog 802-B.

THIS COMPLETE
Airtherm
LINE

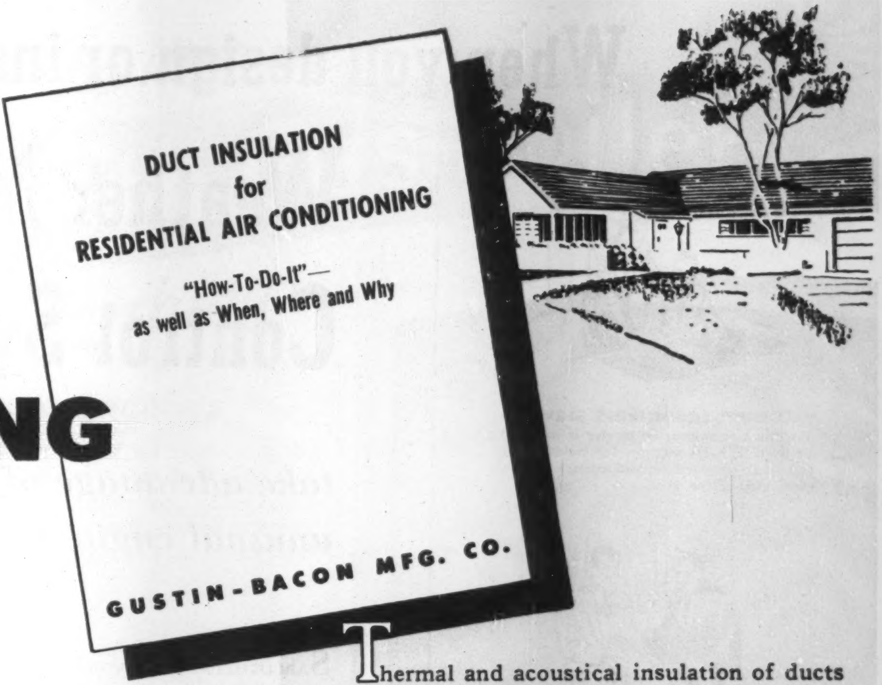
Gives Heating Satisfaction on Every Job

For Heating Satisfaction...
Think First of
Airtherm

AIRTHERM MANUFACTURING COMPANY
711 South Spring Avenue • St. Louis 10, Missouri

MUST READING

for the residential air conditioning trade!



DUCT INSULATION
for
RESIDENTIAL AIR CONDITIONING

"How-To-Do-It"—
as well as When, Where and Why

GUSTIN-BACON MFG. CO.

Thermal and acoustical insulation of ducts can "make or break" an air conditioning job. That's why Gustin-Bacon, manufacturers of glass fiber duct insulation for air conditioning, has prepared a new booklet offering suggestions of value to oldtimers, as well as newcomers in the field. Write for your free copy today.

Answers such questions as these . . .

- *"Which ducts require thermal insulation?"*
- *"When should I use a duct insulation with a vapor barrier?"*
- *"What kind of acoustical treatment do ducts require?"*
- *"What are the fastest and cheapest methods of applying duct insulation and duct liner?"*
- *"Do combination units require special duct insulation?"*

Mail This Coupon Today!

☐ Please send me your new "How-To-Do-It" folder on duct insulation and duct liner for residential air conditioning.

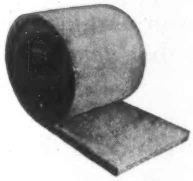
☐ Please send your brochure on Ultralite Duct Insulation and Duct Liner for commercial and industrial air conditioning.

Name______________________________

Firm______________________________

Address____________________________

City__________________State__________



ULTRALITE DUCT INSULATION
(Thermal)
and
ULTRALITE DUCT LINER
(Acoustical)

are insulations of long glass fibers specifically designed for air conditioning application. They are light, flexible, resilient, easy to cut with a knife. "Job size" packages are stocked in 72 cities for prompt delivery. Consult the yellow pages for name of your nearest Ultralite distributor.

gb **GUSTIN-BACON MFG. CO.**
220 W. 10th St., Kansas City, Missouri

New York • Chicago • Philadelphia • San Francisco • Los Angeles
Houston • Tulsa • Dallas • Detroit • St. Louis

When you design or install

Weather Modulated Control Systems...

"ALL-OUT" ENGINEERING SERVICE— Sarcotherm engineering service is in a class by itself. It helps you develop the best control hook-up possible and *carries through* every step of the way.

COMPLETE INSTALLATION DRAWINGS AND WIRING DIAGRAMS—Not just general drawings . . . but complete, tailor-made drawings and diagrams worked up for each individual job.

ON-THE-JOB HELP—Contractors get full cooperation and technical assistance backed by many years of experience.

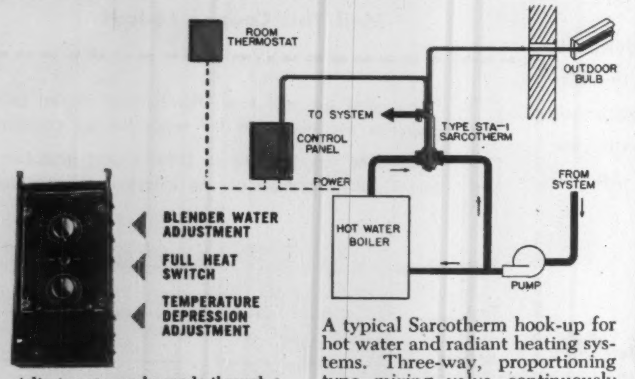
take advantage of this most unusual engineering service!

Sarcotherm offers you an exclusive, all-out engineering service specially designed to save you valuable time in planning and installation.

Its experienced engineering staff is always available. Beginning at the architect's drawing board, Sarcotherm's engineering service extends through the entire job right up to actual operation of the equipment.

Coupled to this service are the basic advantages of Sarcotherm weather modulated controls: simplicity of design; simplicity of installation, operation and maintenance; low initial cost. All these benefits plus unlimited engineering help combine to guarantee you complete user satisfaction and considerable savings in time and operating expense.

Call in a Sarcotherm engineer on your next job. You'll find it profitable. Write for full details.



Adjustments can be made through a convenient manual control panel, or, if required, a fully automatic program panel may be incorporated into the system.

A typical Sarcotherm hook-up for hot water and radiant heating systems. Three-way, proportioning type mixing valve continuously modulates water temperatures as actuated by outdoor-indoor controls.

SARCOTHERM CONTROLS, Inc.

Empire State Bldg., New York 1, N.Y.

An Affiliate of SARCO COMPANY, INC.

Weather Modulated Controls for
HOT WATER, RADIANT AND STEAM
Heating Systems

All along the line . . . H.B. Smith Gas Boiler has Everything

FOR THE ARCHITECT AND ENGINEER

The compact size and high efficiency of the H. B. Smith "Century" permits freedom of design and ease of installation. The boiler is equally at home in rumpus room or boiler room since it is attractive in appearance and clean in operation.

FOR THE CONTRACTOR

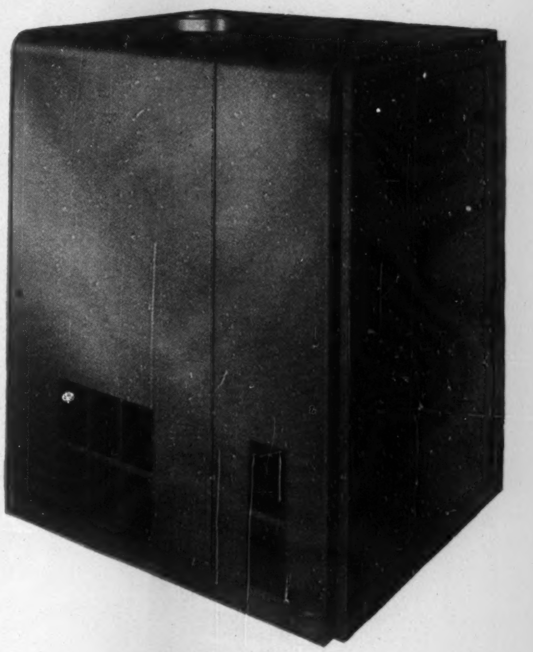
The "Century" is easily assembled by two men in less than two hours. All piping and control connections may be made on *either* the left or right side. All gas controls and safety devices are of the latest A.G.A. listed type, conveniently located.

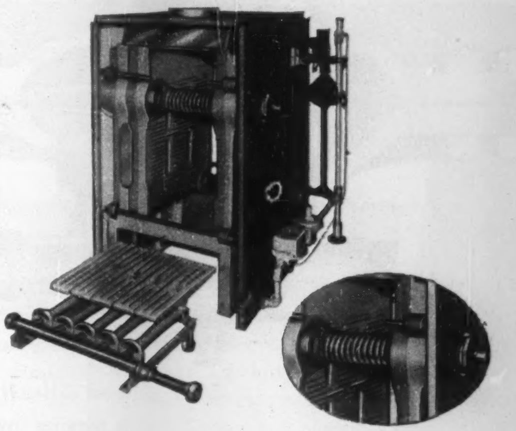
FOR THE GAS COMPANY

The company benefits because here is a gas boiler that is a credit to its fuel (natural, manufactured or mixed). It is far and away the easiest gas boiler to service. Just disconnect one union and the entire burner assembly rolls out on casters. *All* internal surfaces may be cleaned easily without disturbing the draft hood or smoke pipe.

FOR THE OWNER

As they should, the majority of this boiler's many advantages accrue to the user. He enjoys the benefits of moderate initial cost, carefree heat, abundant hot water, and long-life performance which makes his heating *cost per year* an advantageous investment. He will be proud to show his friends his H. B. Smith gas boiler — truly the gas boiler of the century.



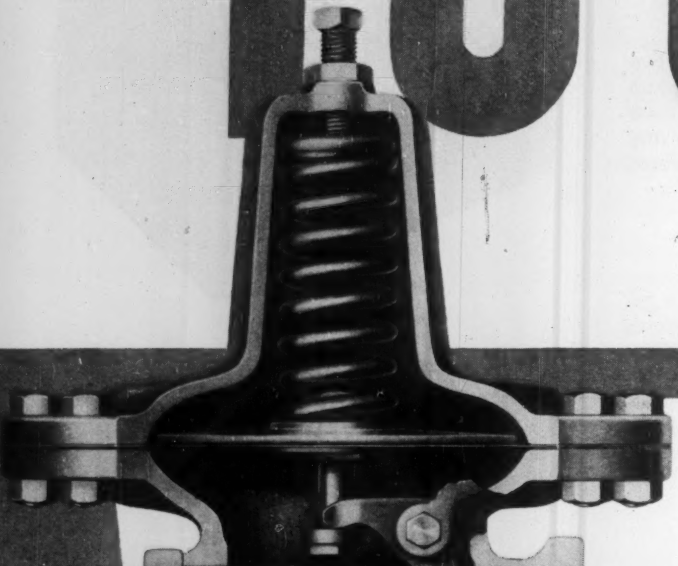


Optional built-in tankless domestic hot water heater provides up to eight gallons per minute. Tank heaters also available.

H.B. Smith CAST IRON BOILERS

Established 1853

THE H. B. SMITH COMPANY, INC., WESTFIELD, MASSACHUSETTS



TYPE 1000 VALVE

Any product of quality should be dependable when *ordinary* products fail. Sudden pressure fluctuations, dirt, scale and viscous matter prove "fatal" to ordinary pressure reducing valves.

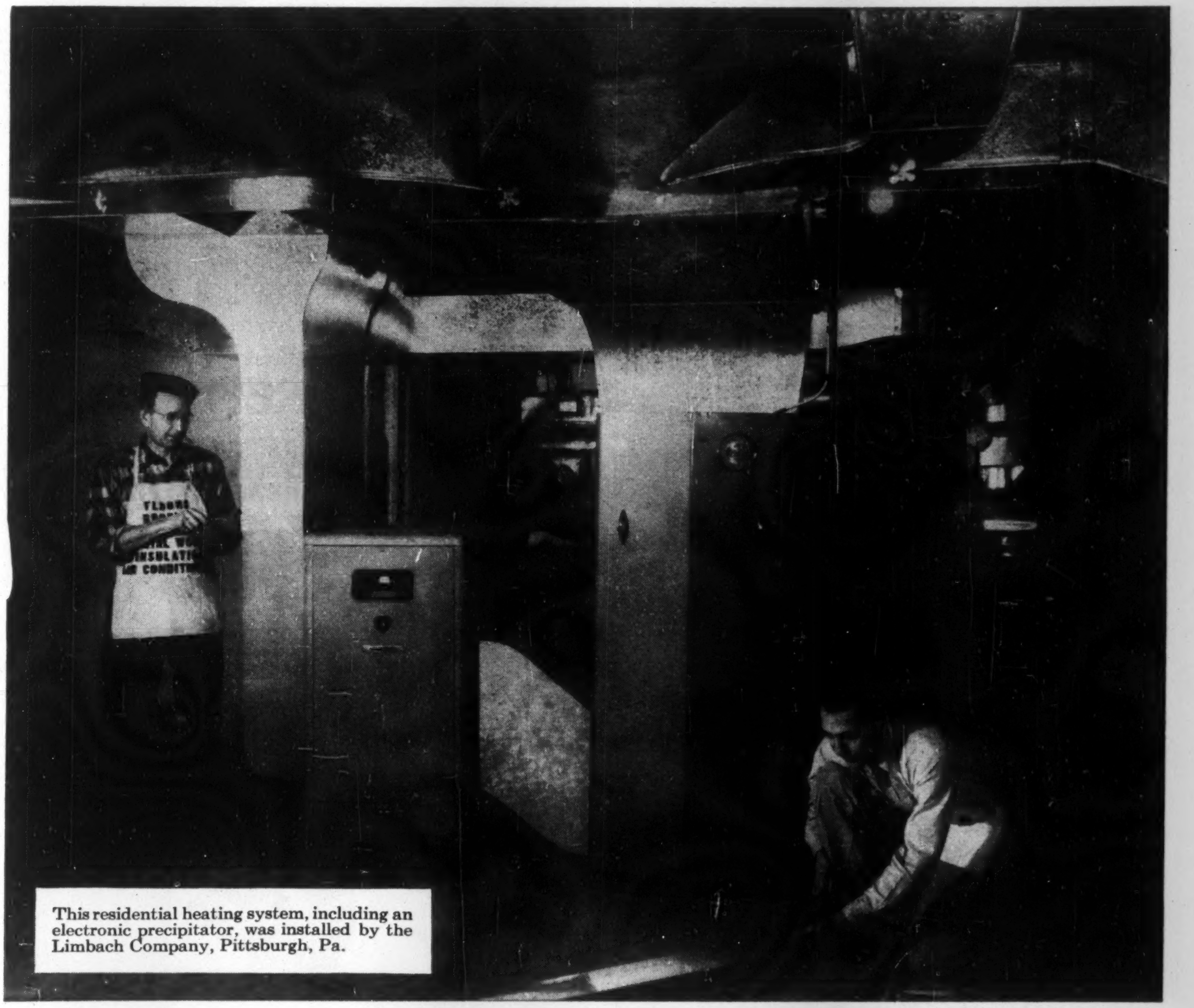
The CASH STANDARD TYPE 1000 VALVE however, is designed to operate with complete dependability under the most difficult and unusual circumstances. Many of these units have been in service over 10 years and have never been taken "out of the line."

Truly an *EXTRAORDINARY* achievement of quality and design excellence.

INSTALL CASH STANDARD "TYPE 1000" VALVES

CASH STANDARD **DECATUR, ILLINOIS**

A. W. CASH COMPANY



This residential heating system, including an electronic precipitator, was installed by the Limbach Company, Pittsburgh, Pa.

For tricky remodeling jobs . . . U·S·S Galvanized Steel Sheets

NEAT seams, tight joints and quality workmanship—on all sorts of new or modernization residential heating jobs—call for good sheets that handle easily, work up nicely. U·S·S Galvanized Sheets are uniform in ductility, flatness and surface finish; they make it easy to handle difficult shapes and angles on residential jobs like the one shown here.

You can bend, roll, cut or stamp these steel sheets in minimum time with satisfactory results. Soldering is no problem. And their tightly adhering zinc coating is highly resistant to cracking and flaking, assuring a long-lasting finish that contributes to the pleasing appearance and quality of every job you turn out.

U·S·S Galvanized Sheets are one of the best-known, most widely-used sheets in the industry. And the U·S·S trade-mark is your assurance of continuing dependable quality. Your customers know and appreciate the U·S·S name. It will pay you to take advantage of this widespread customer acceptance by using U·S·S Galvanized Steel Sheets on all your jobs.

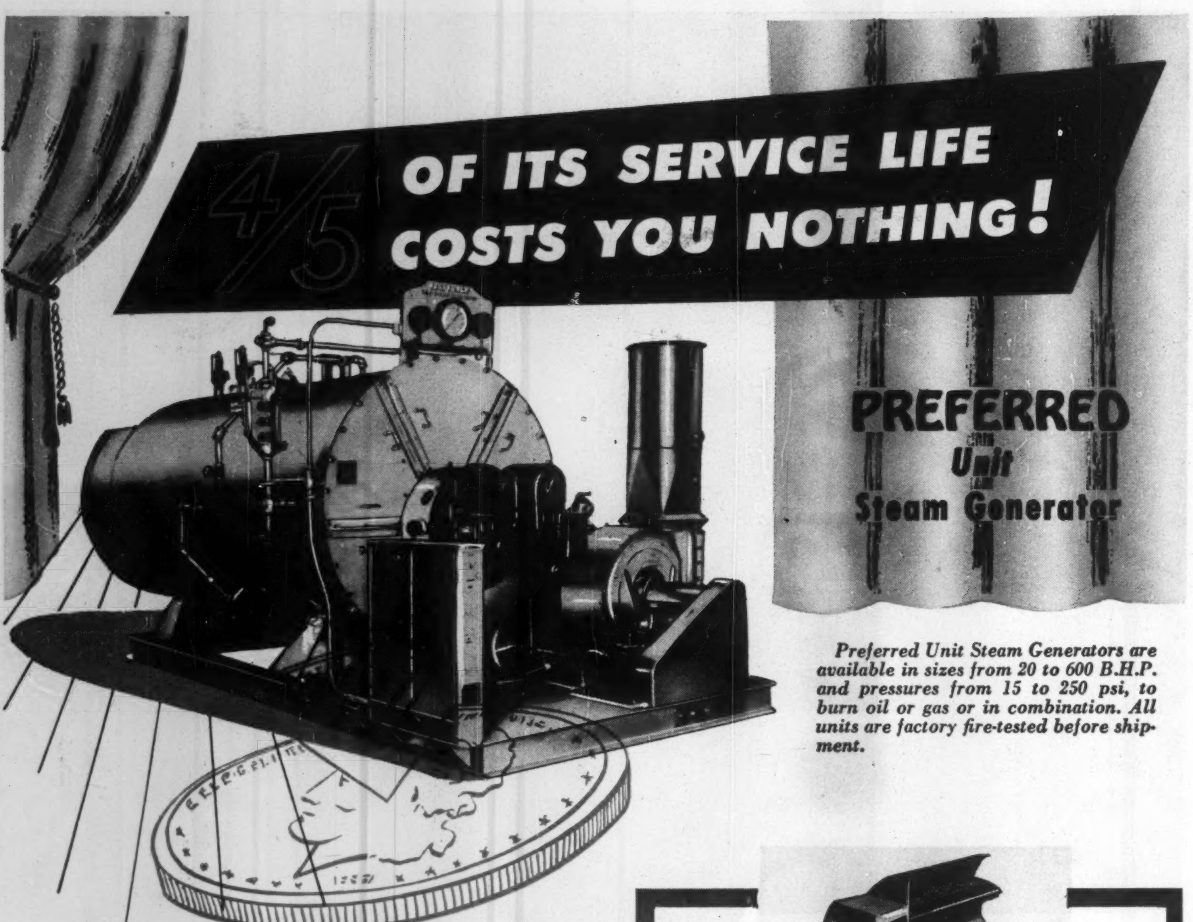
UNITED STATES STEEL CORPORATION, PITTSBURGH · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S GALVANIZED STEEL SHEETS

3-470

UNITED STATES STEEL

4/5 OF ITS SERVICE LIFE COSTS YOU NOTHING!



Preferred Unit Steam Generators are available in sizes from 20 to 600 B.H.P. and pressures from 15 to 250 psi, to burn oil or gas or in combination. All units are factory fire-tested before shipment.

The economies realized in sustained efficiency, fuel consumption and over-all maintenance and operating costs combine to make the Preferred Unit Steam Generator pay for itself in *less* than five years, amortization included. For more than four-fifths of its service life of at least twenty-five years it earns handsome dividends while it continues to deliver steam at the lowest possible over-all cost.

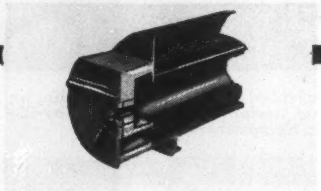
TEN DESIGN FEATURES MAKE THIS POSSIBLE

There are ten outstanding design features incorporated in each Preferred Unit. No other packaged boiler has *all ten* of these features. Their interrelated functions insure steam generation at the lowest possible cost by cutting maintenance costs of all kinds to the bone and by reducing fuel consumption by at least 10%.

STUDY THESE FEATURES IN CATALOG 2000

The function of each of these features in relation to the others and to the unit as a whole is covered in Catalog 2000. It shows why Preferred units pay such a worthwhile return on the investment. Write for it now.

PREFERRED UTILITIES MFG. CORP.
1860 BROADWAY, NEW YORK 23, N. Y.
Dept. SH-1



PREFERRED'S ANTI-STRESS DECK

Prevents damage in the sheet area by maintaining the sections of the rear tube sheet above and below the water line in close balance. Unequal stress action is eliminated. The Anti-Stress Deck is one of the ten design features which insure long service life and low over-all maintenance and operating costs. Here are the other nine...

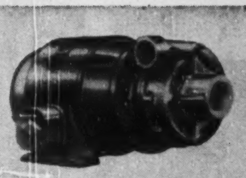
- Five Sq. Ft. of Heating Surface per Boiler HP
- Four Pass Gas Travel
- Down Draft Design
- Induced Draft
- Intermediate Furnace Position
- Expansile Precipitator
- Staggered Tubes
- Dual Purging Action
- Full Automatic Oil and/or Gas Burners

FOR *ALL* *your* PUMPING problems:

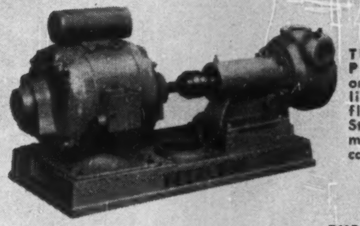
- HOT OR COLD WATER CIRCULATING
- LOW PRESSURE WATER HANDLING
- HIGH PRESSURE PUMPING
- BOOSTER PRESSURE SYSTEMS
- WATER SUPPLY AND TRANSFER
- LARGE VOLUME LOW HEAD PUMPING
- CHEMICAL PROCESS SERVICE PUMPS

YOU CAN DO A BETTER JOB with these *Dependable* PEERLESS PUMPS

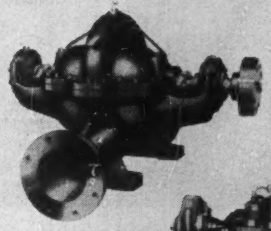
VERTICAL
HORIZONTAL



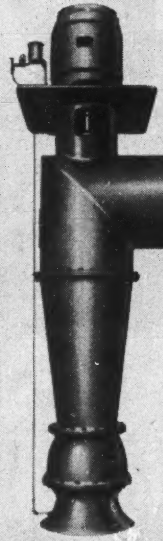
END SUCTION PUMPS—The Peerless "Fluidyne" line. Economical face mount and flexible coupled pumps for widest variety of water handling services. ¼ to 150 hp available. Efficient, easily serviced.



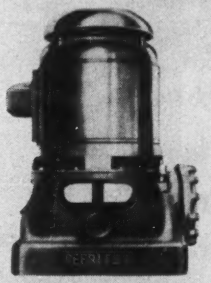
TURBINE VANE TYPE PUMPS—For pumping hot or cold, clear or vaporous liquids. Face mount or flexible coupled types. Standard and self-priming models for pumping small capacities, high heads.



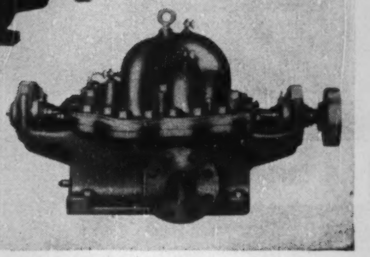
TYPE A—ALL PURPOSE WATER PUMP—Single stage double suction split case type pumps. Broad line, up to 70,000 gpm capacity. All types of drive; quality construction.



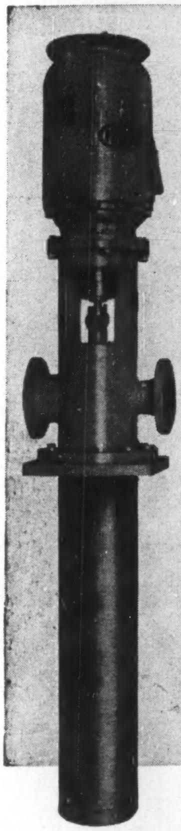
MIXED FLOW AND PROPELLER PUMPS—Giants in the world of pumping. For high capacities, low head. Single and multi-stage types for all water services. Also widely applied to flood control and drainage pumping. Capacities to 220,000 gpm.



VERTICAL TURBINE TYPE PUMPS—Electric and engine driven pumps for primary water supply from deep or shallow drilled wells. America's sales leader. All sizes, capacities and hp.



TYPE TU—MULTI-STAGE PUMP—For high pressure pumping. 2, 3, 4 and 5-stage pumps available. Horizontal split case design. For capacities up to 3500 gpm; heads to 1600 feet.



VERTICAL ENCASED CENTRIFUGAL PUMP—The Peerless "Hydro-Line." For heavy duty condensate return service. Rugged, dependable, versatile, vertical design.

PEERLESS PUMPS

fmc

PEERLESS PUMP DIVISION

FOOD MACHINERY AND CHEMICAL CORPORATION

Factories: Los Angeles, Calif. and Indianapolis, Indiana.
Offices: New York; Atlanta; Chicago; St. Louis; Indianapolis; Phoenix; Fresno; Los Angeles; Tulsa; Dallas, Plainview, and Lubbock, Texas; Albuquerque, New Mexico.
Distributors in Principal Cities; Consult your Telephone Directory.

Mail Coupon TODAY!

PEERLESS PUMP DIVISION
FOOD MACHINERY AND CHEMICAL CORPORATION
301 West Avenue 26, Los Angeles 31, California

CHECK BULLETINS YOU REQUIRE

☐ TURBINE VANE PUMPS Bulletin B-2205	☐ VERTICAL ENCASED HYDROLINE PUMP Bulletin B-592	☐ MULTI-STAGE PUMPS Bulletin B-1400
☐ FLUIDYNE END SUCTION PUMPS Bulletin B-2300	☐ TYPE A ALL PURPOSE PUMP Bulletin B-1300	☐ WATER SUPPLY PUMPS Bulletin B-141

NAME____________________

COMPANY____________________

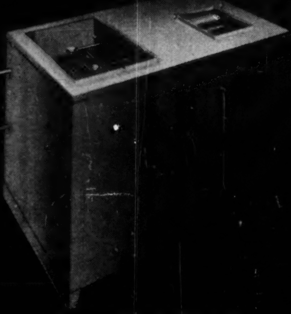
STREET____________________

CITY________________STATE________

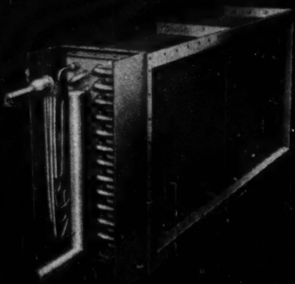
HP&AC

1. air conditioning

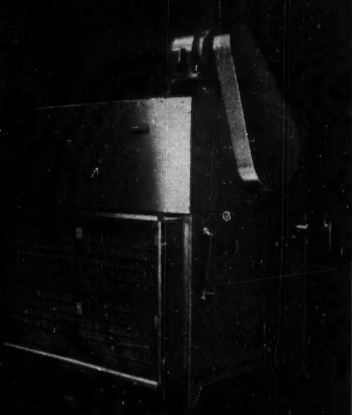
UNIT AIR CONDITIONERS
15 models



EVAPORATIVE CONDENSORS
2 types, 13 sizes

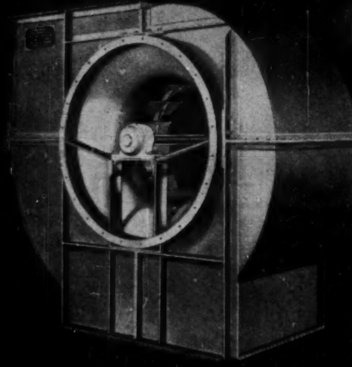


COOLING COILS
5 types

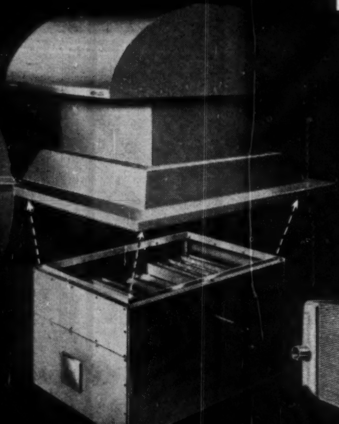


CLIMATE CHANGERS
28 models

2. ventilating

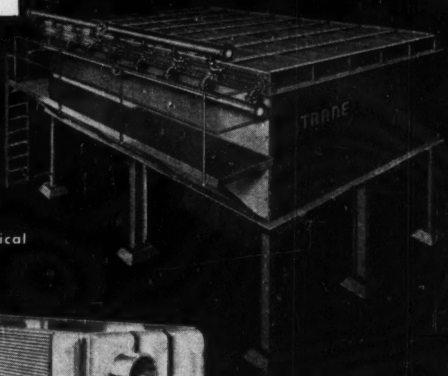


FANS
forward curved,
backwardly inclined,
utility, propeller

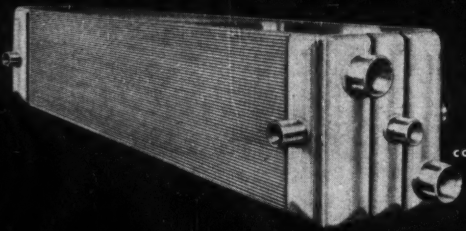


ROOF VENTILATORS
power units with or
without heating coils

3. heat transfer

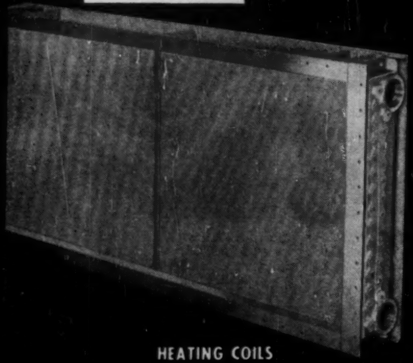


DRY-TYPE FLUID COOLERS
2 series—
horizontal or vertical
air stream



BRAZED ALUMINUM HEAT EXCHANGERS
complete range of
core sizes and surfaces

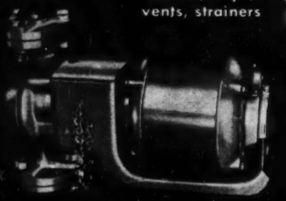
4. heating



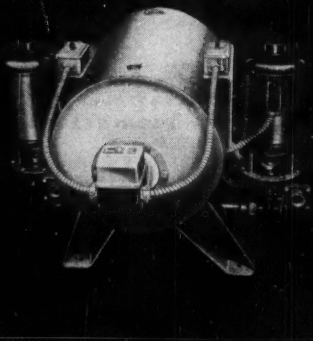
HEATING COILS
8 types
in non-freeze, standard,
high pressure steam,
special purpose

UNIT HEATERS
5 types
in horizontal or
vertical delivery—gas,
hot water or steam

STEAM SPECIALTIES
valves, traps,
vents, strainers

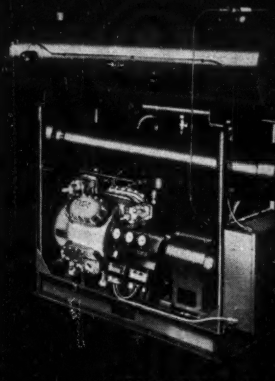


HOT WATER PRODUCTS
circulators,
valves, fittings,
compressor tanks

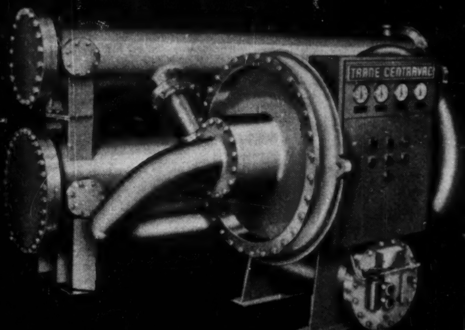


PUMPS AND CONDENSATE PUMPS
¼ to 7½ h.p.

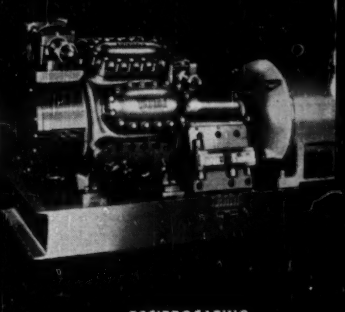
SELF-CONTAINED AIR CONDITIONERS
3 to 20 tons



COLD GENERATORS
packaged water chillers
10 to 100 tons



CENTRAVAC
45 to 400 ton
hermetic centrifugal
refrigeration units



RECIPROCATING COMPRESSORS
3 to 50 tons

Trane — the single source for all 4

1. Air Conditioning 2. Ventilating 3. Heat Transfer 4. Heating

The success of your job is assured in two big ways when you make it a TRANE job *all the way* . . . whether it's air conditioning, heating, ventilating or heat transfer.

First, you are getting products that are designed and built for service together. They're matched. Consequently, they're bound to serve you better.

Secondly, you're concentrating the responsibility with *one* manufacturer . . . not dividing the responsibility among many.

Only TRANE offers you matched products in *all four* fields—1) air conditioning, 2) ventilating, 3) heat transfer, 4) heating.

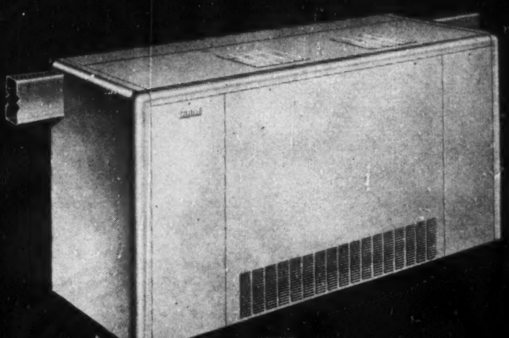
For complete data on any or all of the TRANE lines illustrated on these pages, contact your nearest TRANE sales office or write TRANE, La Crosse, Wisconsin.

one source . . . one responsibility TRANE

MANUFACTURING ENGINEERS OF AIR CONDITIONING, HEATING, VENTILATING AND HEAT TRANSFER EQUIPMENT

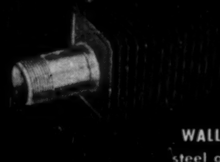
The Trane Company, La Crosse, Wis. • East. Mfg. Div., Scranton, Penn. • Trane Co. of Canada Ltd., Toronto • 87 U.S. and 14 Canadian Offices.

BASEBOARD CONVECTORS
8¼" and 12" heights



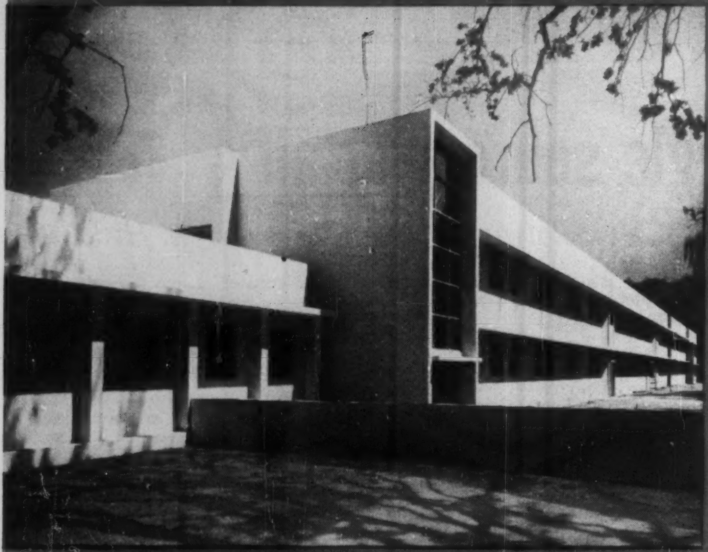
UNIT VENTILATORS
7 types in ceiling, recessed, free-standing, with or without shelving and lateral extensions

CONVECTORS
22 models



WALL-FIN HEATERS
steel or non-ferrous, grilles or cabinets, steam or hot water

OPERATION "SUCCESS"



Doctors agree that few physical aspects of a hospital contribute more to successful treatment and the rapid recovery of patients than quiet, dependable air conditioning. To insure the finest, Utility Blowers were selected for the Stockton, California State Hospital.

Manufacturers of heavy and standard duty blowers for heating, air conditioning and ventilating installations. Producers of blowers and blower parts for original equipment manufacturers. Write for catalogue data.

UTILITY FAN CORP.

911 EAST 59th STREET
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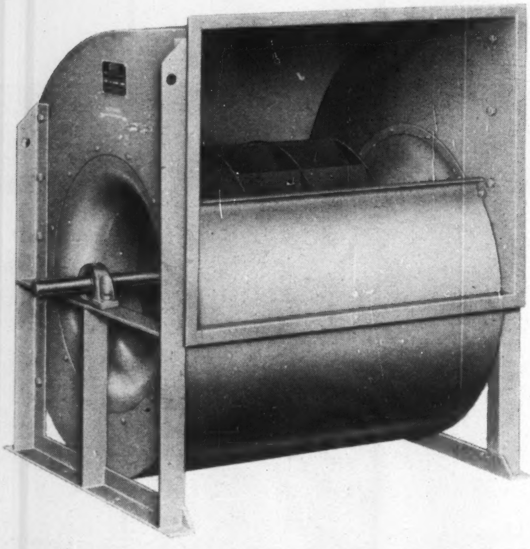
UTILITY

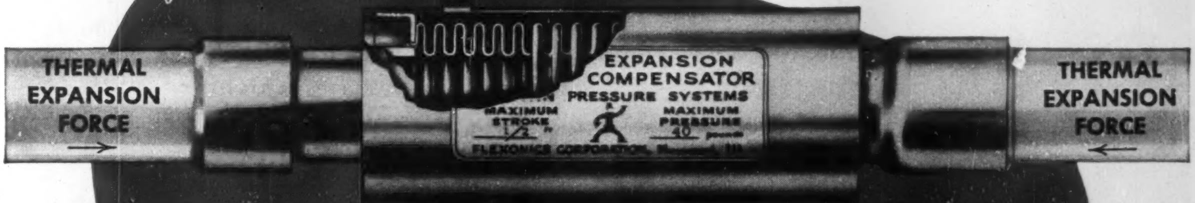
A DIVISION OF
UTILITY APPLIANCE CORP.



Built, tested and rated in accordance with A.S.H.V.E. and N.A.F.M. codes. Sizes 6" to 60".

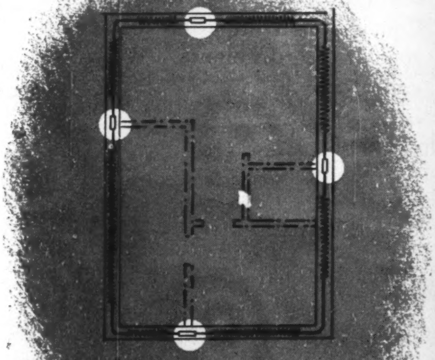
ANNOUNCING...

a practical, economical answer to expansion control in heating systems



The FLEXON EXPANSION COMPENSATOR

HERE'S HOW TO USE IT



Use a Flexon Expansion Compensator in each straight run of piping and tubing, baseboard radiation systems and finned convector systems, etc.

Now you can have a scientifically engineered expansion compensator that is especially designed to absorb thermal expansion in steam or hot water heating system lines. Designed and manufactured by Flexonics Corporation, a leading fabricator of heavy-duty expansion joints for industrial piping, the Flexon Expansion Compensator is backed by over 52 years manufacturing experience.

The Flexon Expansion Compensator consists of a two ply phosphor bronze bellows with copper tube end connections, enclosed in a floating protective shroud of brass. All joints are electronically sealed with silver solder for long leak-proof life. There is no packing to replace, no maintenance whatsoever. Just install the units as easily as any fitting and then forget them. Flexonics Expansion Compensators are designed to outlast the building. Long cycle life is proved by extensive testing under installation conditions. The cost is moderate and puts an end to leakage and to pipe creeping noises caused by uncontrolled expansion.

Flexon Expansion Compensators are made in ¾″, 1″, 1¼″ and 2″ sizes for use in hot water or low pressure steam systems. Contact your local distributor for further information or use the coupon below for your copy of a descriptive bulletin.

Flexonics *Corporation*

Flexon identifies products of Flexonics Corporation that have served industry for over 52 years.

EXPANSION JOINT DIVISION
1391 S. Third Avenue
Maywood, Illinois

FLEXONICS CORPORATION HPAC
Maywood, Illinois

Please send me the bulletin which describes the Flexon Expansion Compensator.

Name____________________

Company____________________

Address____________________

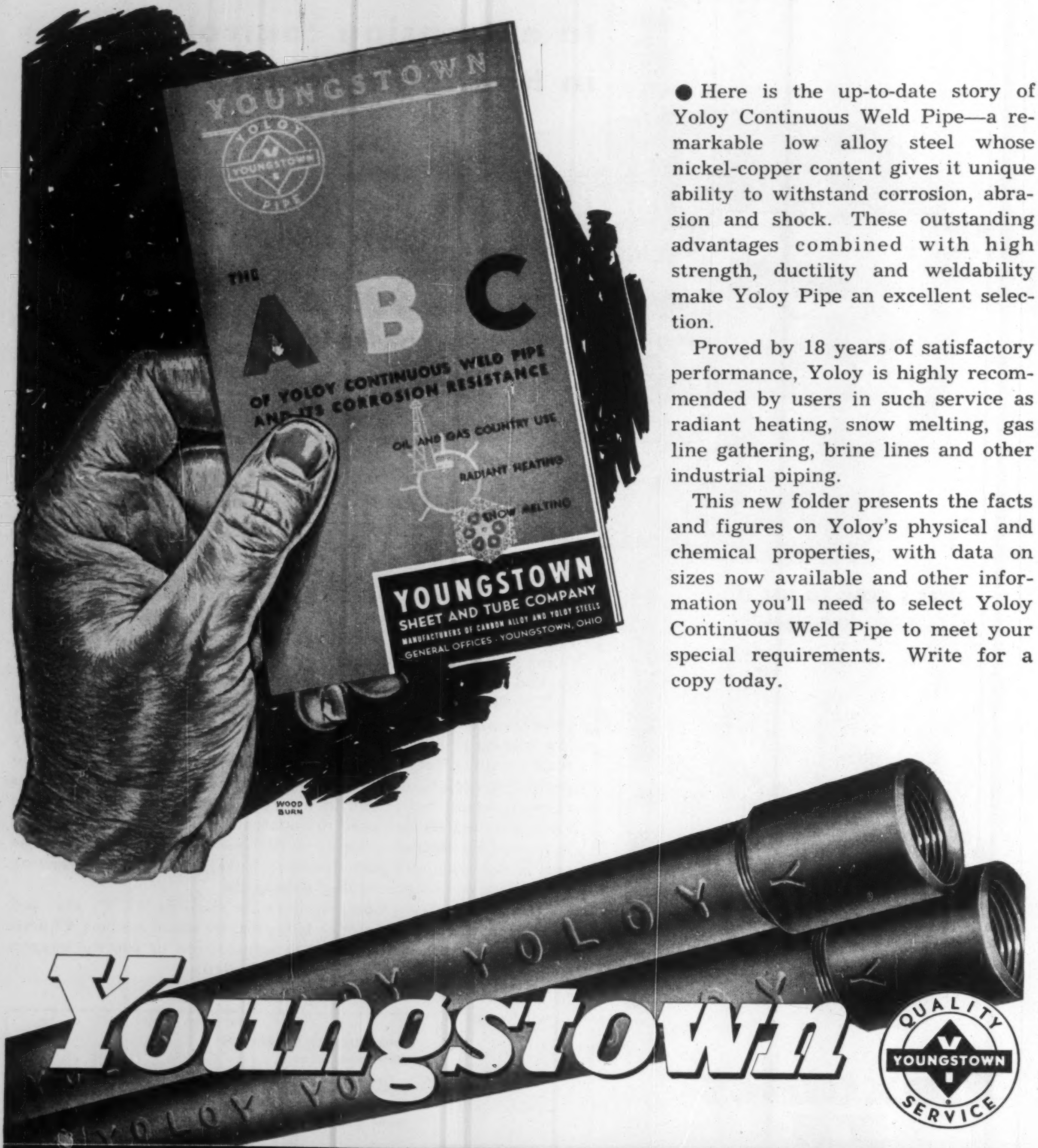
City__________ Zone_____ State________

This DATA may solve YOUR piping problem

● Here is the up-to-date story of Yoloy Continuous Weld Pipe—a remarkable low alloy steel whose nickel-copper content gives it unique ability to withstand corrosion, abrasion and shock. These outstanding advantages combined with high strength, ductility and weldability make Yoloy Pipe an excellent selection.

Proved by 18 years of satisfactory performance, Yoloy is highly recommended by users in such service as radiant heating, snow melting, gas line gathering, brine lines and other industrial piping.

This new folder presents the facts and figures on Yoloy's physical and chemical properties, with data on sizes now available and other information you'll need to select Yoloy Continuous Weld Pipe to meet your special requirements. Write for a copy today.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PIPE
THE
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OF YOLOY CONTINUOUS WELD PIPE
AND ITS CORROSION RESISTANCE
OIL AND GAS COUNTRY USE
RADIANT HEATING
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YOUNGSTOWN
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THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

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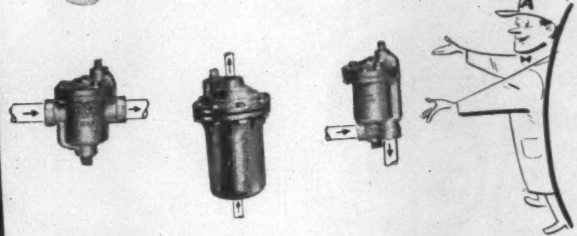
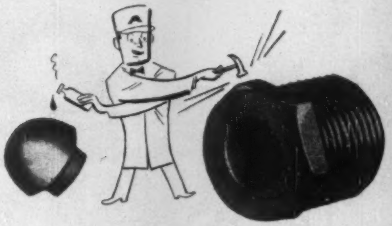
COLD FINISHED CARBON AND ALLOY BARS - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - WIRE - PIPE AND TUBULAR PRODUCTS - CONDUIT - RODS - SHEETS - PLATES - BARS - RAILROAD TRACK SPIKES.

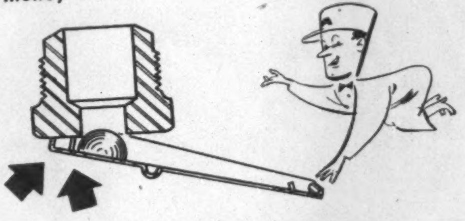
How Armstrong Traps Save you Money



Choice of body styles saves money on installation costs.

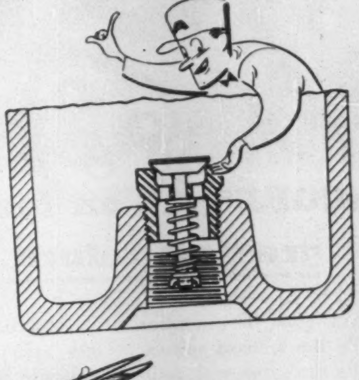


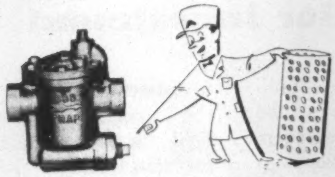
Hardened, ground and lapped valve and seat; stainless steel mechanism resists wear and corrosion—saves money on maintenance.



Two phase leverage means higher capacity in a smaller trap. Armstrong traps have optimum relation between leverage, valve travel, bucket weight, capacity and overall size.

This internal check valve saves labor and fittings required to install regular check valve.





This trap with built-in strainer costs less than separate trap and strainer—requires less labor and fittings to install.

Get the full facts on money-saving Armstrong traps. Send for free Catalog J. Clip and mail coupon today.

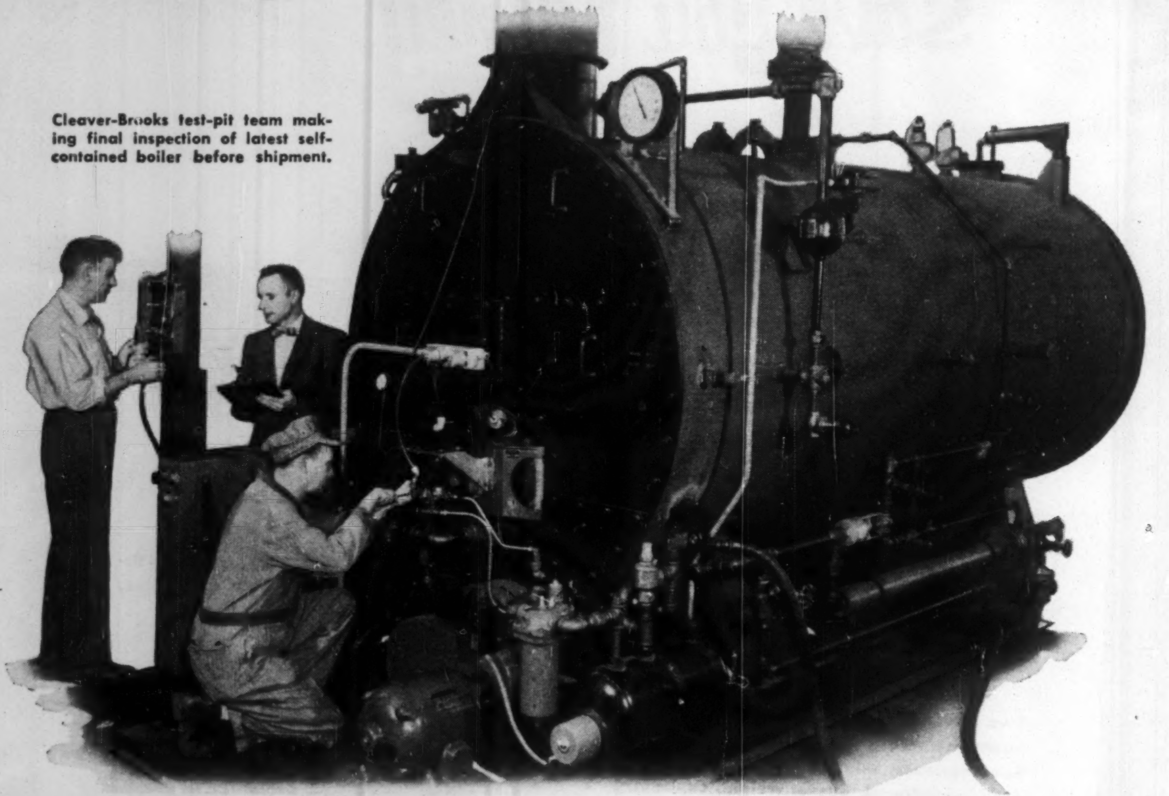
ARMSTRONG MACHINE WORKS
874 Maple Street, Three Rivers, Michigan

Gentlemen: Please send me a free copy of Catalog J, The Armstrong Steam Trap Book.

Name ____________________
Position ____________________
Co. Name ____________________
Address ____________________
Please Print

ARMSTRONG STEAM TRAPS

"*Test-Pilots*" have their counterpart at Cleaver-Brooks



Cleaver-Brooks test-pit team making final inspection of latest self-contained boiler before shipment.

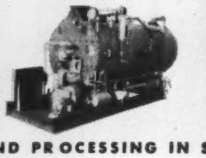
HIGH SCORES . . . on factory and on-job tests guarantee greatest return from boiler investment

When test pilots give the familiar "O.K." — that's the sign of proven performance. It's the same with boilers in the Cleaver-Brooks plant. Only after accurate, thorough inspection and testing under actual operating conditions do boilers get the final "O.K." from experienced test engineers. That's why you get guaranteed 80% efficiency from your Cleaver-Brooks boiler when firing with oil.

A record of this test is available to every buyer on request. In fact, you as a buyer, consultant, or contractor are invited to witness the actual test on your Cleaver-Brooks boiler before shipment.

And further, Cleaver-Brooks boilers are placed in operation at the job site by factory service engineers who check installation, train your operators and make complete and detailed field tests.

So, when you buy a boiler, insist on factory tests as well as field service tests by qualified engineers. There is no better way of insuring yourself of the very best value money can buy and the greatest return from your boiler investment. Look to Cleaver-Brooks, the leader in the "Packaged" Boiler field for two decades. Write today for latest Catalog AD-100.



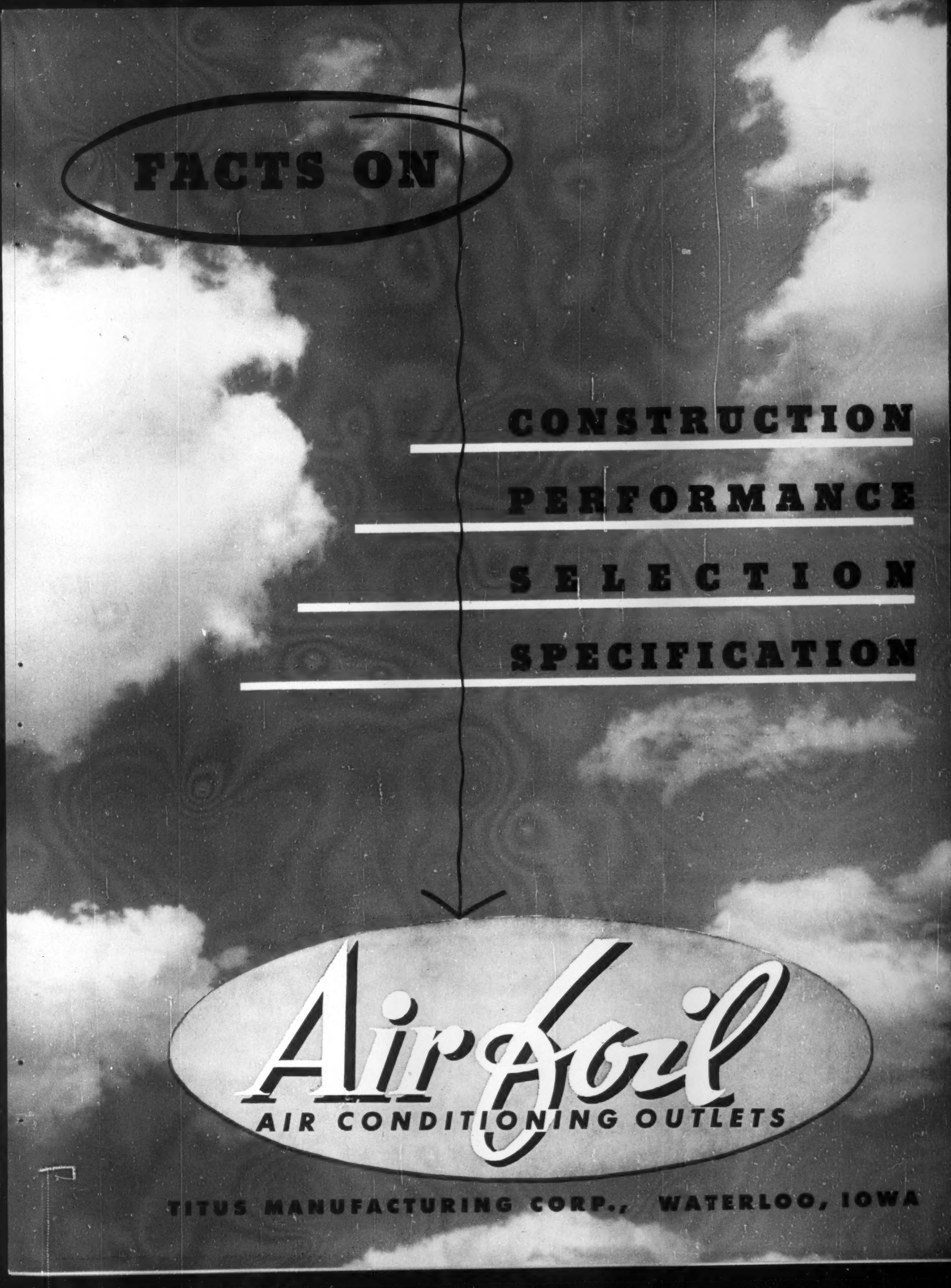
Available for oil, gas and combination oil/gas firing.

CLEAVER-BROOKS COMPANY
Dept. A-312 E. Keefe Ave.
Milwaukee 12, Wisconsin, U.S.A.

Cleaver-Brooks

Originators of the Self-Contained Boiler

BOILERS — STEAM OR HOT WATER — FOR HEATING AND PROCESSING IN SIZES FROM 15 TO 500 HP, 15 TO 250 PSI



FACTS ON

CONSTRUCTION

PERFORMANCE

SELECTION

SPECIFICATION

Airfoil

AIR CONDITIONING OUTLETS

TITUS MANUFACTURING CORP., WATERLOO, IOWA

Airfoil

DIRECTIONAL OUTLETS

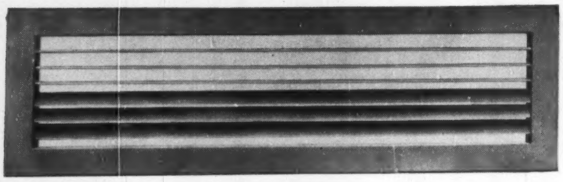
2 WAY CONTROL

Series No. 271 grilles provide 2-Way control. They have one set of individually adjustable louvers. Louver surface is smooth as glass. This smoothness assures lower wind resistance and minimum turbulence. All Airfoil Registers and Grilles have one piece frames with special patented concealed reinforcements.

Unsightly mullions and butted construction are eliminated. This superior design and construction gives a neater appearance. Increases air diffusion efficiency. Decreases noise and loss of free area caused by old type mullions. Sponge rubber gaskets and countersunk screw holes are standard on all Airfoil directional outlets.

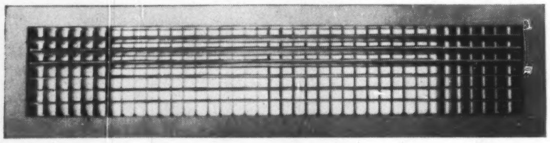
4 WAY CONTROL

4-Way directional outlets provide complete control of air stream. A quick simple adjustment creates any air pattern desired. No. 2, No. 270, and No. 8 Series are available as illustrated at right. Note these outstanding features . . . 1. Smooth as glass Airfoil louvers. 2. Solid section louver construction for minimum noise, — streamlined. No sharp corners, no holes, no crevices. 3. One-piece, extra heavy frame. 4. Air-tight rubber gasket to prevent air leakage. 5. Extra wide 1-1/4" beveled edge border. 6. Countersunk screwholes. NOTE: when shut-off or damper control, is required, we refer you to Series No. 4, 274 and 276 at far right.



SERIES No. 271

A high quality commercial type grille. Has one set of individually adjustable AIRFOIL louvers. 3/4" spacing. Louvers are 3/4" deep for complete control of air stream. Specify L-271 for louvers parallel to the long dimension — S-271 for louvers parallel to the short dimension. For closer 1/2" spacing, specify L-7 or S-7.



SERIES No. 270

Highest quality four-way directional grille. Two sets extra deep, 3/4" AIRFOIL louvers. Each individually adjustable. 3/4" spacing. L-270 features front louvers parallel to the long dimension, rear louvers parallel to the short dimension. S-270 features front louvers parallel to the short dimension, rear louvers parallel to the long dimension.

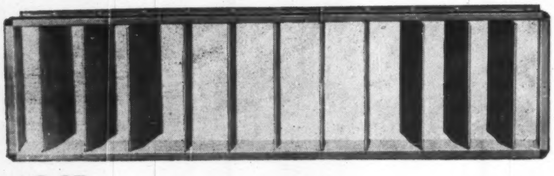
Airfoil

VOLUME CONTROLLERS

The Titus Airfoil line provides a complete selection of units for absolute control of air stream. These units can be installed directly behind the grille, or in the junction of a duct and a branch take-off. The AG-25 provides individually adjustable volume control. The AG-35, an opposed action volume controller, gives faster, easier balancing of a system. The AF-325 combines grille with volume controller. The AG-45 acts as a combination air extractor and a volume controller. All of these Units have the features which provides complete draftless air distribution and long satisfactory service.

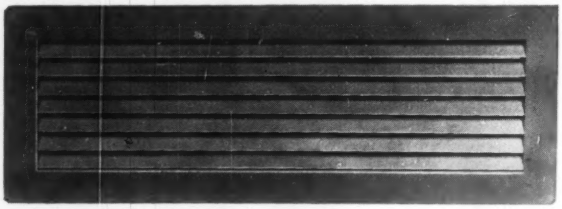
RETURN AIR GRILLES

These return air grilles and registers are the finest available. All have extra heavy gauge louvers which are hemmed for added strength and better appearance. Blades are smooth and easily cleaned with a soft cloth. Greater savings are possible because of the larger free area. Standard finish on all registers and grilles is a grey lacquer primer. A large selection of other colors may be obtained. These are available at slight extra cost. More detailed information can be obtained by sending for complete Airfoil Catalog. This shows dimensional drawings, engineering and selection data, and price lists.



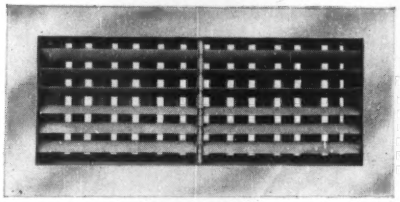
AG-25

Designed to fit into duct behind grille. Insures even distribution of air over grille face. Individually adjustable AIRFOIL deflecting louvers. Deflecting blades constructed so that either half of any blade is adjustable, independent of the other half. Assembled with the axis of blades off center to allow rear louvers to extend farther back into air stream. Held in place by friction. Installs quickly—easily.



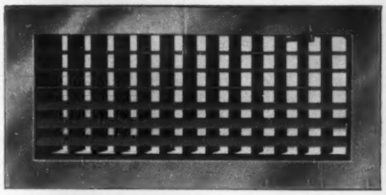
SERIES No. R-230

Designed to match Airfoil Air Conditioning Outlets. Rugged construction — finer appearance. Over 80% free area. Deep fins with easy curved deflection on 3/4" spacing. Standardized at 0 or 45 degrees. Most easily cleaned of any return air grille available. Specify RL-230 for blades parallel to the long dimension, RS-230 for blades parallel to the short dimension.



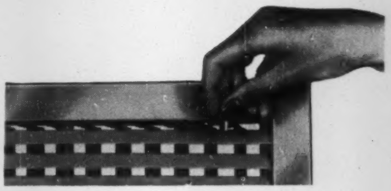
SERIES No. 275

Neat appearance, outstanding efficiency. Double deflection register with opposed blade damper, key operated. Specify L-275 front louvers parallel long dimension; S-275 front louvers parallel short dimension.



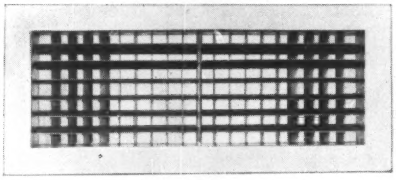
SERIES No. 274

Outstanding register combines AIRFOIL double directional grille with a multi-shutter damper. Front louvers spaced on 3/4" centers, 3/4" deep. Rear shut-off blades on 1" centers. Available as L-274 with front blades the long way, damper blades the short way, or S-274, front blades the short way, rear blades the long way.



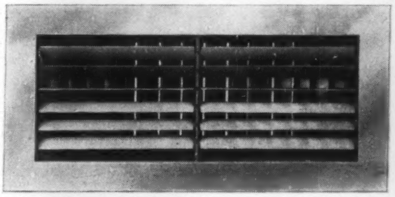
REMOVABLE LEVER LOCK

Titus removable lever lock prevents unauthorized persons from tampering with air flow. Note that entire lever is removed. Furnished on any Titus AIRFOIL multi-shutter registers as optional at no extra cost. Specify Removable Lever Lock.



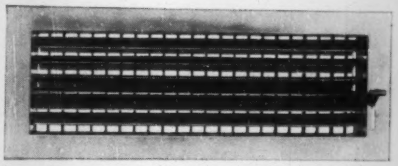
SERIES No. 8

Finer appearance with closer spacing. Two sets of individually adjustable AIRFOIL louvers. L-8 features front louvers parallel to the long dimension, rear louvers parallel to the short dimension. S-8 features front louvers parallel to the short dimension, rear louvers parallel to the long dimension.



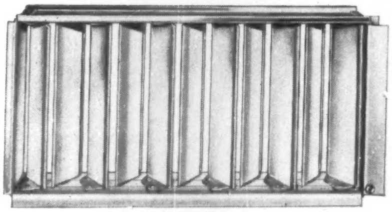
SERIES No. 277

Maximum directional control, positive volume control. 4-way registers with opposed blade dampers. Two front sets Airfoil louvers individually adjustable, 3/4" spacing. Opposed blade damper key operated in rear. L-277 features front louvers parallel long dimension; S-277 features front louvers parallel short dimension.



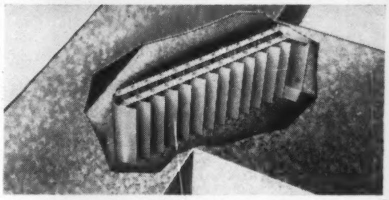
SERIES No. 276

Assures maximum directional control, positive volume control and shut-off at lowest price. Two front sets of AIRFOIL louvers individually adjustable. Spaced on 3/4" centers. Rear shut-off blades interlock and are spaced on 1" centers. Available as L-276 with front louvers parallel to the long dimension, and S-276 with front louvers parallel to the short dimension.



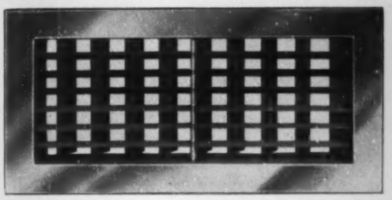
AG-35

Superior opposed acting volume controller. Provides complete control of air volume to the outlet with minimum disturbances of air pattern. Louvers move simultaneously in opposite directions and can be set at any degree from full open to full closed.



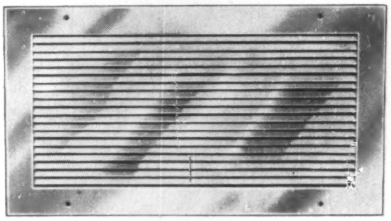
AG-45

Air volume extractor and controller. Will control air volume and also produce balanced air distribution. Replaces extra volume controller. Fifty percent savings on cost and installation.



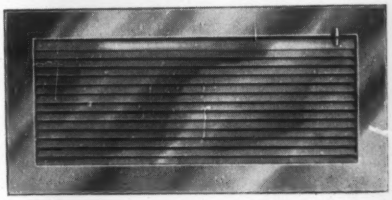
AF-325

Practical combination grille and volume controller. Combines L-271 grille with AG-25 volume controller. Built as one unit. Ideal for exposed ductwork. Controls both air volume and 4-way distribution. Cuts installation time in half — costs 30% less than separate volume controller and grille.



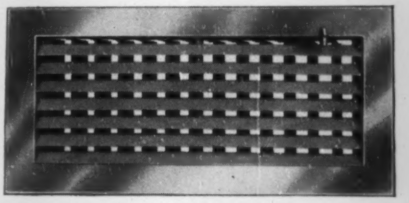
SERIES No. R-21

Superior quality. Close spacing for finer appearance. Blades on 3/8" centers. Deep fins have easy curved deflection. Standardized at 0 or 45 degrees. Greater free area — more strength. Specify RL-21 for blades parallel the long way; RS-21 for blades parallel the short way.



R-22

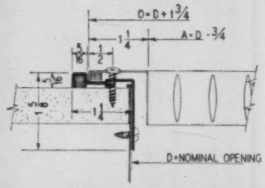
Consisting of the No. 21 return air grille plus multi-shutter damper blades in rear. Rear multi-shutter damper blades are 1-3/8" deep spaced on 1" centers. Available as RL-22 with front blades the long way, rear blades the short way; or RS-22 front blades the short way, rear blades the long way.



SERIES R-240 & R-241

Greater free area. More complete shut off or volume control. R-240 combines # 230 return air grille with multishutter damper blades. R-241 combines # 230 with opposed blade damper. Specify RL-240 or RL-241 front blades the long way or RS-240 or RS-241 for front blades the short way.

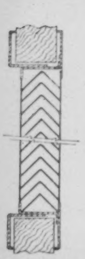
Airfoil AIR CONDITIONING OUTLETS

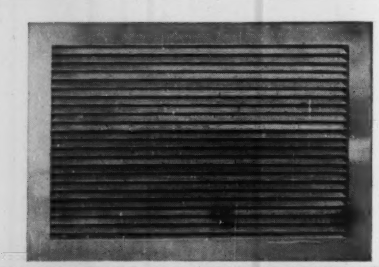


FRAME 115

FOR ALL AIRFOIL GRILLES AND REGISTERS

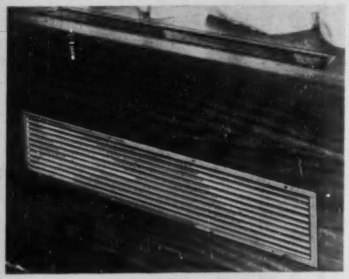
Allows quick easy removal for cleaning or adjusting. Can be installed either before or after plastering has been completed. Frame may be embedded in plaster. Each frame has sponge rubber gasket to prevent air leakage. Edge acts as plaster lock. Designed for use with Titus Airfoil registers and grilles only.





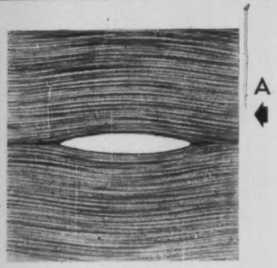
SERIES T-700 AUXILIARY FRAME

No-Vision door and partition grilles. Made of strong, all steel construction. V shaped louvers on 1/2" centers set securely in end frames. No rattle when doors are slammed. Attractive in appearance. Widely used for exhaust and return air grilles. There is maximum free area, yet the grilles are completely sight-proof. Available in Style A having channel frame for use with quarter-round, or Style B, having flanged frame on one side. Auxiliary frame as shown far left is available with Style B.



CONVECTOR GRILLES

These are custom designed grilles available at standard prices. Made to withstand heaviest use and abuse which lower wall grilles must take. Tamper proof, extra-heavy support bars — over 70% free area. Available in four styles. C2100 and C2300 grilles and C2200 and C2400 registers. Write for complete catalog information on this line of grilles custom designed for use with convectors.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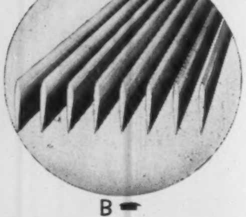

B

A. STREAMLINED LOUVER DESIGN

Airfoil louver is patterned after the wing section of an airplane. Aerodynamically designed to give maximum control of air at all times. Note how airflow flows over smooth as glass surface with minmum turbulence, minimum noise.

B. SOLID SECTION AIRFOIL LOUVERS

Made from extruded material. Solid metal throughout. Smooth as glass surface. Handles air correctly. Diffuses it with minimum noise and turbulence

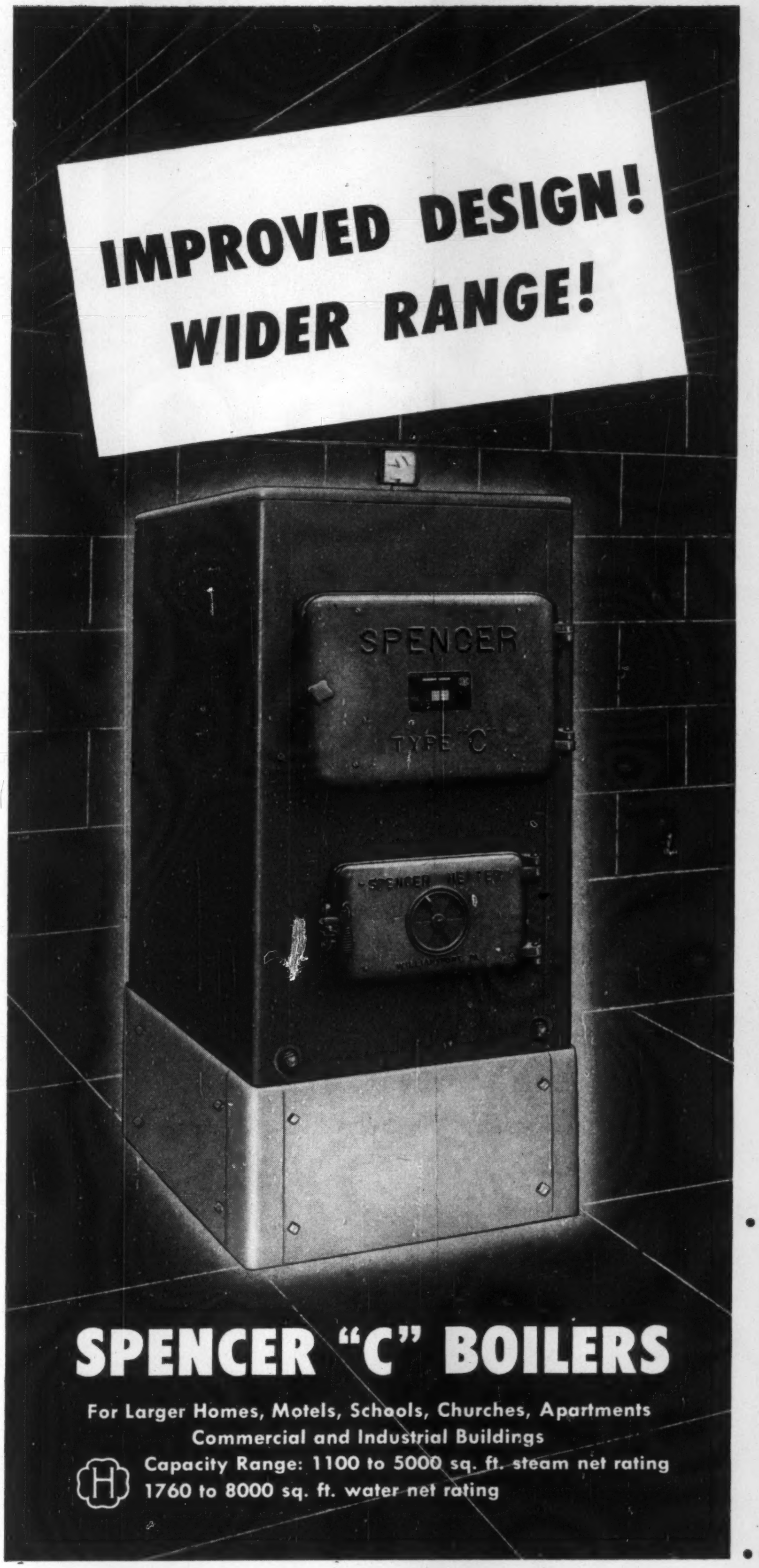
SALES REPRESENTATIVES IN ALL PRINCIPAL CITIES

Abilene, Texas
Albany, N. Y.
Albuquerque, N. M.
Atlanta, Ga.
Baltimore, Md.
Binghamton, N. Y.
Boise, Idaho
Boston, Mass.
Buffalo, N. Y.
Charleston, W. Va.
Charlotte, N. C.
Chicago, Ill.
Cincinnati, Ohio
Cleveland, Ohio
Columbus, Ohio
Dallas, Texas
Davenport, Iowa
Dayton, Ohio
Denver, Colo.
Des Moines, Iowa
Detroit, Michigan
Fort Wayne, Ind.
Fort Worth, Texas
Hartford, Conn.
Houston, Texas
Indianapolis, Ind.
Jacksonville, Fla.
Kansas City, Mo.
Los Angeles, Calif.
Memphis, Tenn.
Miami, Fla.
Milwaukee, Wis.
Missoula, Mont.
Newark, N. Jersey
New Orleans, La.
New York, N. Y.
Omaha, Nebr.
Pittsburgh, Pa.
Philadelphia, Pa.
Phoenix, Ariz.
Portland, Oregon
Rochester, N. Y.
St. Louis, Mo.
St. Paul, Minn.
Salt Lake City, Utah
San Antonio, Texas
San Francisco, Cal.
Seattle, Wash.
Shreveport, La.
Spokane, Wash.
Tacoma, Wash.
Tampa, Fla.
Toledo, Ohio
Tulsa, Okla.
Washington, D. C.

REPRESENTATIVES OUTSIDE OF THE UNITED STATES

Caracas, Ven. S. A.
Honolulu, Hawaii
Montreal, Quebec, Canada
San Juan, Puerto Rico
Vancouver B. C., Canada

TITUS MANUFACTURING CORP. . . . . . . WATERLOO, IOWA


IMPROVED DESIGN!
WIDER RANGE!
SPENCER
TYPE "C"
SPENCER HEATER
SPENCER "C" BOILERS
For Larger Homes, Motels, Schools, Churches, Apartments
Commercial and Industrial Buildings
Capacity Range: 1100 to 5000 sq. ft. steam net rating
1760 to 8000 sq. ft. water net rating

SPENCER'S

POPULAR "C" BOILERS NOW OFFER NEW FEATURES . . . NEW SIZES . . . MORE ATTRACTIVE PRICES!

Now, the most popular series in Spencer's quality line of boilers is available for a wider range of jobs . . . and at more attractive prices.

Improved design now makes this outstanding boiler available with standard 15″ base or extra base heights, at nominal charge, for special fuel-burning installations. Four new larger models, with heavy 3″ fire tubes, have been added to the line, providing greater range in application.

Here are some of the outstanding features of the Spencer "C" Boilers: water-cooled, precision-ground flue and fire-door frames, equipped with heavy cast-iron insulated doors; extra-heavy steel-plate smokeboxes; staggered boiler tubes for rapid heat transfer; service water-heating coils in many capacities.

Entire boiler line available with attractive standard jackets, insulated with glass wool, with beautiful blue-gray hammerloy finish.

Any fuel can be fired in the Spencer "C" Boilers. Easily and quickly converted from hand to automatic firing.

For any job—residential, industrial or commercial—requiring 1100 to 5000-sq.-ft. net load steam, low pressure, specify one of Spencer's "C" Series. *Save dollars and provide the highest quality heating plant available.*

SPENCER
HEATER
LYCOMING DIVISION
WILLIAMSPORT AVCO PENNSYLVANIA

● ●

Spencer Heaters—Dept. HP 1-4
Lycoming Division
AVCO Manufacturing Corp.
Williamsport, Pennsylvania

Dear Sirs:
Please send additional information and specifications on the new Spencer "C" Series Boilers to:

Name____________________

Position____________________

Company____________________

Address____________________

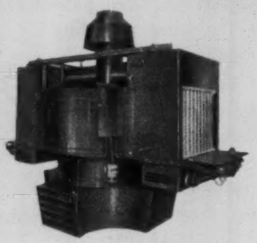
City________Zone______State______

● ●

REVOLVING UNIT HEATERS

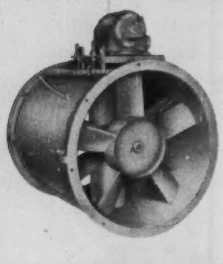
The discharge outlets revolve slowly, distributing the heated air vertically downward in a constantly changing direction. May also be used for summer ventilation.

GAS-FIRED UNIT HEATERS



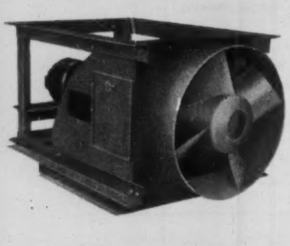
The only vertical discharge gas-fired unit heaters. Operate without steam or water on manufactured gas, natural gas or mixed gases. Stationary or revolving discharge outlets.

STRAIGHT LINE DUCT FANS



Designed to form a part of any straight run of duct. Motor is outside of casing. V-belt drive is through an air tube through casing. Fan is WINGFOIL Axial Flow Fan. Bearings are grease-sealed.

ELBOW TYPE DUCT FANS



Designed to take the place of an elbow in a duct system. Motor and drive are outside of airstream remaining cool, clean and easily accessible. Fanwheel is non-overloading WINGFOIL fan.

Wing

Since 1879, **WING equipment for heating, ventilating and combustion has been proving its worth in daily, satisfactory, trouble-free service. Today, the name WING offers unusual value for the competitive conditions confronting us in the immediate future.**

WING efficiency, reliability and economy have been proven in countless installations in every industry and under practically all conditions of service.

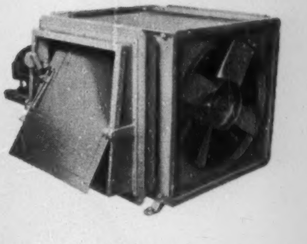
WING has been pioneer and leader in the fields of ventilation by axial flow fans, in factory heating by unit heaters, in forced and induced draft, both motor and turbine driven, and in auxiliary steam turbines.

The name WING on the equipment you specify is a guarantee of economy and satisfactory performance.

L. J. Wing Mfg. Co.

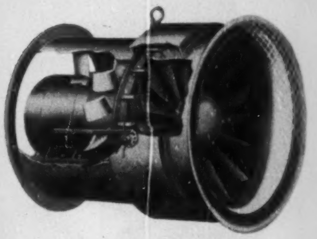
140 Vreeland Mills Road • Linden, N. J.
Factories: Linden, N. J. and Montreal, Can.
European representative for heaters:
WANSON, Haren Nord, Brussels, Belgium

DRAFT INDUCERS



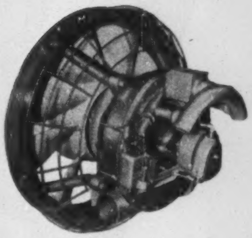
Assure positive draft at all times, regardless of weather conditions. Fan and bearing assembly easily withdrawn for servicing. No alignment required. No lubrication needed. Wide capacity range.

MOTOR-DRIVEN BLOWERS



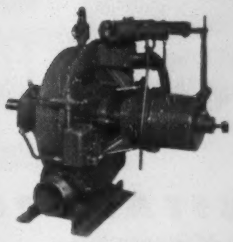
For oil or gas burners, stokers, pulverized fuel and hand-fired boilers. For statics up to 10 in. Volumes up to 50,000 CFM. Manual or automatic capacity variation. Static efficiencies up to 80%.

TURBINE-DRIVEN BLOWERS

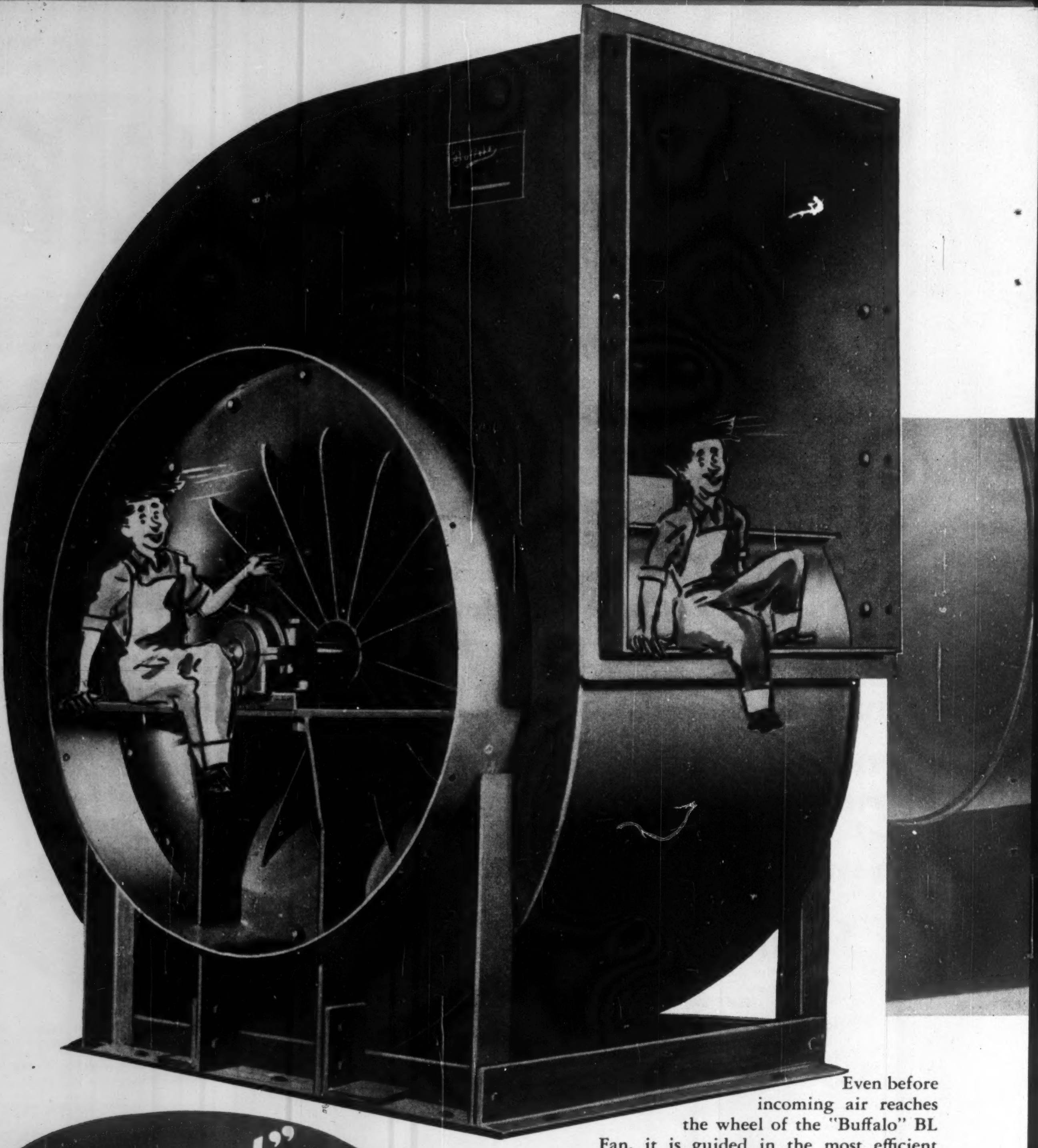


Easily installed on burner fronts or boiler settings, eliminating duct work, providing precise draft control, manually or automatically. Negligible operating cost.

STEAM TURBINES



Used for driving fans, pumps, generators, stokers, etc. Horizontal or vertical shaft designs. Clock wise or counter-clock wise. To 150 HP. Temp. to 750° F. Speeds to 4000 RPM.



Even before incoming air reaches the wheel of the "Buffalo" BL Fan, it is guided in the most efficient path. The inlet bell is smoothly curved for absolute minimum friction; while the welded-on stationary inlet vanes reduce turbulence and assure rated air delivery even if inlet conditions are unfavorable. The "Buffalo" inlet is one reason why "Buffalo" air-moving costs are low.

"Buffalo"

BUFFALO FORGE COMPANY

171 Mortimer Street Buffalo, N. Y.

PUBLISHERS OF "FAN ENGINEERING" HANDBOOK

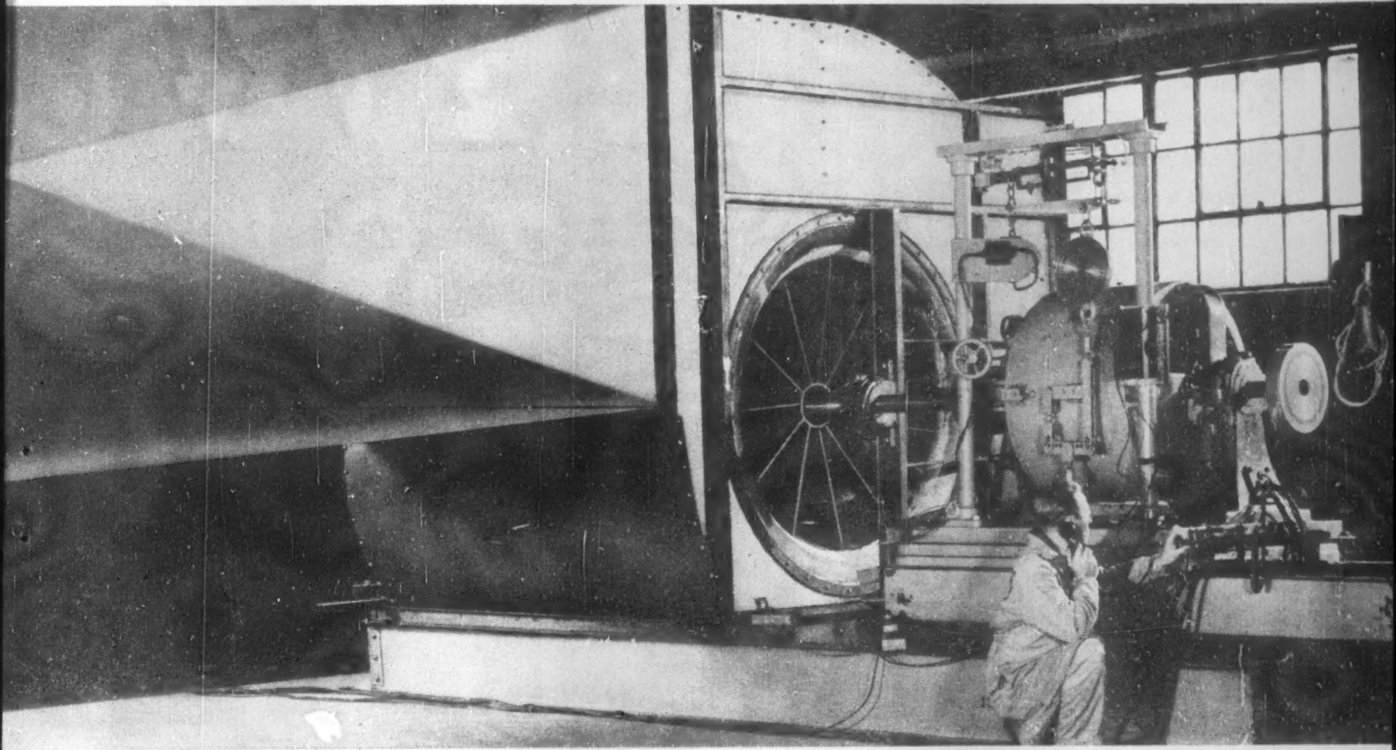
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

Sales Representatives in all Principal Cities

VENTILATING • FORCED DRAFT • COOLING •

FROM INLET TO OUTLET HERE'S MORE AIR PER DOLLAR

...WHEN YOU SPECIFY "BUFFALO" TYPE BL FANS

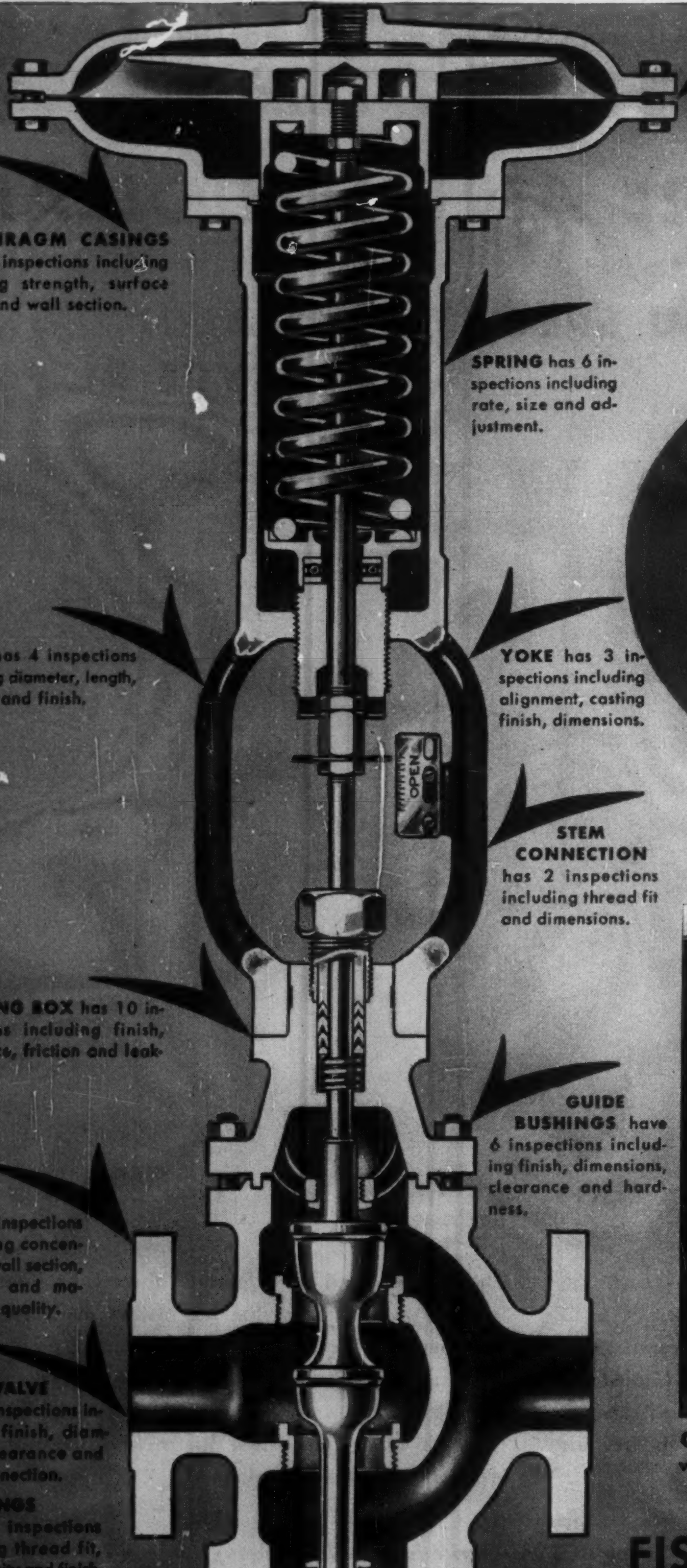


Air leaving the "Buffalo" rotor continues thru the housing and outlet just as smoothly and easily as it entered the fan. Properly shaped and proportioned housing scroll and outlet assure this. The Limit-Load characteristic makes it impossible to overload the fan, and performance is stable from shut-off to free air delivery.

Besides these and other features, there is an intangible in all "Buffalo" fans that has always made for high satisfaction. We call it the "Q" factor, or built-in quality which provides long life and freedom from trouble. This is the sum total of the 77 years of "Buffalo" experience and know-how that goes into every fan to leave our plant.

For further details on "Buffalo" Type BL Fans, write for new Engineering Bulletin F-100

AIR CLEANING • AIR TEMPERING • INDUCED DRAFT • EXHAUSTING • HEATING • PRESSURE BLOWING



DIAPHRAGM has 3 inspections including bursting strength, quality of molding.

DIAPHRAGM CASINGS have 5 inspections including bursting strength, surface finish and wall section.

SPRING has 6 inspections including rate, size and adjustment.

STEM has 4 inspections including diameter, length, threads and finish.

YOKE has 3 inspections including alignment, casting finish, dimensions.

STEM CONNECTION has 2 inspections including thread fit and dimensions.

STUFFING BOX has 10 inspections including finish, clearance, friction and leakage.

GUIDE BUSHINGS have 6 inspections including finish, dimensions, clearance and hardness.

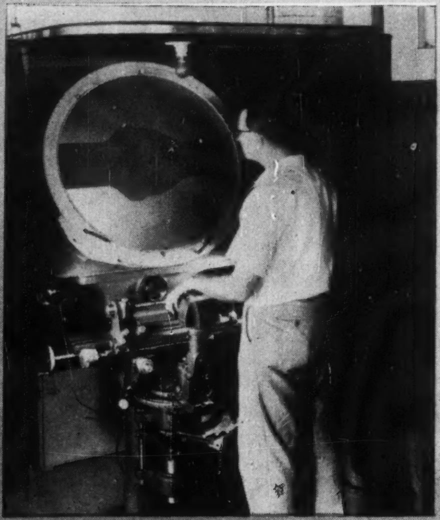
BODY has 9 inspections including concentricity, wall section, casting and machining quality.

INNER VALVE has 13 inspections including finish, diameters, clearance and stem connection.

SEAT RINGS have 8 inspections including thread fit, concentricity and finish.

214

214 More



OPTICAL COMPARATOR: Used to check inner valve contours and thread forms.

FISHER GOVERNOR

LEADS THE INDUSTRY IN

QUALITY CONTROL

FISHER®

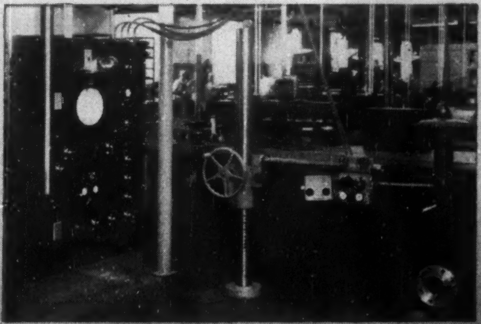
Automatic Controllers

Inspections

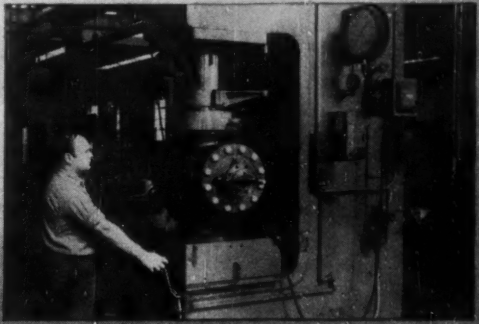
Reasons WHY FISHER GIVES YOU MORE FOR YOUR MONEY!

Pressure Regulators — Pump Governors — Liquid Level Controllers — Pilot Operated Regulators — Lever and Float Valves — Intermitters — Gas Regulators — Valve Positioners

Here at Fisher we believe that *inspection makes perfect.* That's why *every* Fisher Automatic Controller is subjected to an *expert* and *comprehensive* inspection procedure. Typical of this rigid quality control program is the inspection schedule of the Fisher Type 57T diaphragm motor valve illustrated, with a few of the more prominent inspections indicated. From "start to finish", a total of *214 inspections* assures *long trouble-free service* in meeting the most exacting operating requirements. Yes, this Fisher *insistence on perfection* is another example of why Fisher Automatic Controllers always give you *more for your money!*



HYSTERESIS TEST PANEL:
To detect misalignment, friction and check range of operation. Certified test certificates on specification.



HYDROSTATIC TESTING MACHINE:
Hydraulic pressure testing procedure for casting soundness, as prescribed by ASA.

COMPANY • Marshalltown, Iowa

RESEARCH FOR BETTER PRESSURE CONTROL

FISHER®

Since 1880

WINTER
SPRING
Make the Seasons come to YOU...
SUMMER
FALL

WITH *McQuay* YEAR-ROUND AIR CONDITIONING

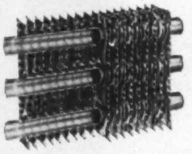
PROVED AND PREFERRED...a complete line!

You're assured of comfort in any season when you install McQuay year-round air conditioning. McQuay products are proved and preferred—for their efficiency, economy of operation, and the way they stand up under long hard use.

Join the growing list of architects, engineers, and contractors who depend upon McQuay to satisfy all of their heating and air conditioning requirements.

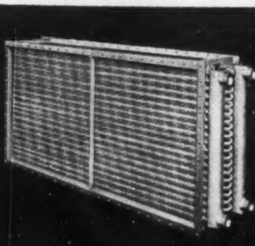
Consult the McQuay representative in your territory or write McQuay Inc., 1601 Broadway St. N.E., Minneapolis, Minnesota.

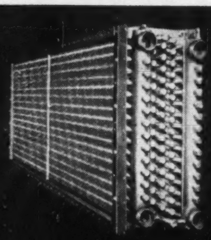
FAMOUS RIPPLE-FIN CONSTRUCTION

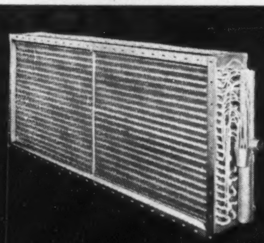


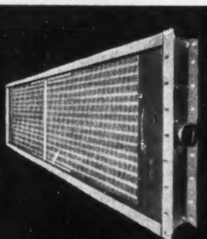
Ripple-fin coil construction is the product of years of research aimed at producing the ultimate in heat transfer for any weight metal. High efficiency is assured by forcing the air to follow an ever-changing direction of flow in passing through the coil. Thus the air repeatedly contacts coil surface to give maximum contact time, maximum contact velocity and a resultant optimum heat transfer. The staggered tube and rippled edge features, so well known to the industry, contribute greatly to higher heat transfer, construction ruggedness and eye appeal.

AIR CONDITIONING COILS

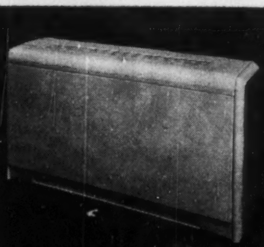

WATER COIL
For Cooling and Heating,
1 to 10 rows deep.


CLEANABLE TUBE WATER COIL
Removable Plug Type,
1 to 10 rows deep.

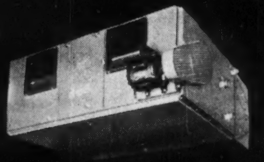

DIRECT EXPANSION COIL
For Cooling, 1 to 8 rows deep.

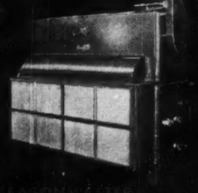

HEATING COIL
In 1 or 2 rows deep,
using low or high pressure steam.

AIR CONDITIONING UNITS

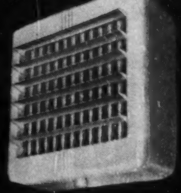

SEASONMAKER—(FLOOR)
Also available in basic or ceiling
types, 3 sizes, 200 cfm,
400 cfm and 600 cfm.

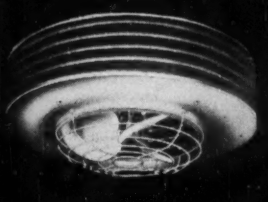
[illegible] AIR CONDITIONER
4 sizes—2 to 10 Ton Models—
For use with hot or cold water,
steam or direct expansion.

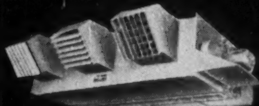

SEASONMASTER
(SUSPENDED MODEL)
Type "AC" Central Station Air
Conditioners in 14 sizes for
industrial and commercial
applications.

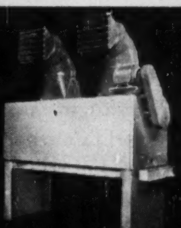

SEASONMASTER
(FLOOR MODEL)
Type "AC" Central Station Air
Conditioners in 14 sizes for
industrial and commercial
applications.

UNIT HEATERS


HORIZONTAL UNIT HEATER
24 sizes with Nominal Capacity
range 20,300 to 360,000 Btu's.


DOWN FLOW UNIT HEATER
22 sizes with Nominal Capacities
from 25,400 to 500,000 Btu's.

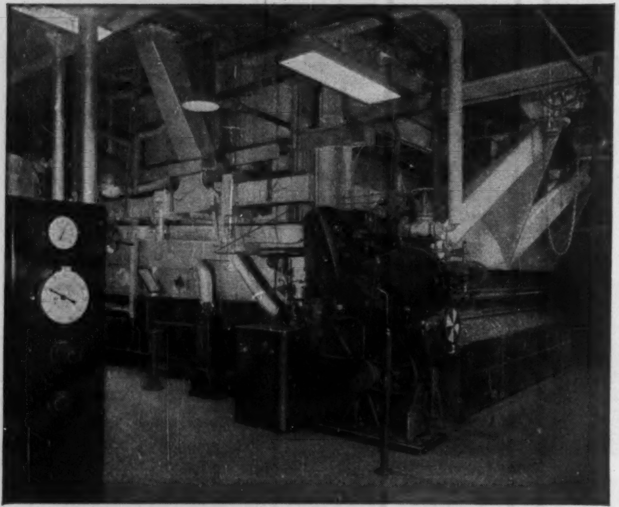

HEATING AND VENTILATING
UNIT (SUSPENDED MODEL)
20 sizes with Nominal Capacities
from 20,600 to 1,600,000 Btu's.


BLOWER TYPE UNIT HEATER
(FLOOR MODEL)
20 sizes with Nominal Capacities
from 20,600 to 1,600,000 Btu's.

McQuay INC.
1601 BROADWAY ST. N. E., MINNEAPOLIS, MINNESOTA

HEATING
AIR CONDITIONING
REFRIGERATION

NATIONAL CASH REGISTER SAVES $70,000 A YEAR WITH MODERN COAL EQUIPMENT!



One of the two new boilers used to supply base steam loads for NCR's plant. Older pulverized coal boilers handle swings.

NCR recently installed two modern, stoker-fired boilers in their Dayton, Ohio plant. They supply the major part of the steam used in generating power for 28 factory buildings and heat for nearly 72 acres of floor space. The savings made have convinced NCR that for high efficiency and low costs, you can't beat an up-to-date bituminous coal-fired installation.

Big Loads! Loads run up to 300,000 lbs. per hour. Annual coal consumption is about 60,000 tons.

No smoking allowed! Located near a residential area with strict control regulations, National uses dust collectors and smoke recorders to make coal clean and convenient.

Additional case histories, showing how other types of plants have modernized and saved money with coal, are available upon request.

Before you build a new plant or remodel your present one, let a consulting engineer show you how a modern bituminous coal installation—tailored to your needs—can save you money.

With modern coal-burning equipment, you can save from 10% to 40% on steam costs. Automatic coal- and ash-handling systems can cut your labor costs to a minimum.

You're set for the future, too, with coal. Coal reserves are virtually inexhaustible. America's highly mechanized coal industry is the world's most efficient. Thus you are assured of a dependable supply of coal, at relatively stable prices, for years to come.

BITUMINOUS COAL INSTITUTE
A Department of National Coal Association
Southern Building, Washington 5, D. C.

If you operate a steam plant, you can't afford to ignore these facts!

BITUMINOUS COAL in most places is today's lowest-cost fuel, and coal reserves in America are adequate for *hundreds of years to come*.

COAL production in the U.S.A. is highly mechanized and by far the most efficient in the world.

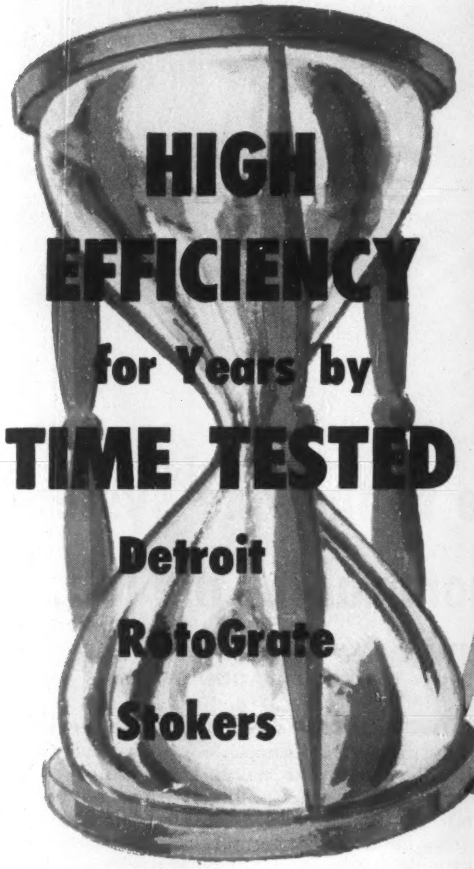
COAL prices will therefore remain the most stable of all fuels.

COAL is the safest fuel to store and use.

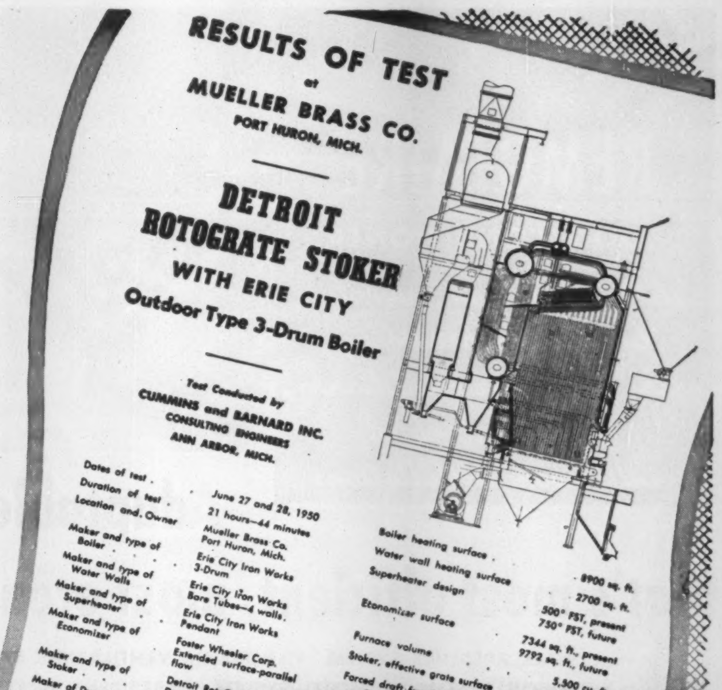
COAL is the fuel that industry counts on more and more—for with modern combustion and handling equipment, the inherent advantages of well-prepared coal net even bigger savings.

FOR HIGH EFFICIENCY — FOR LOW COST

YOU CAN COUNT ON COAL!



HIGH EFFICIENCY for Years by TIME TESTED Detroit RotoGrate Stokers



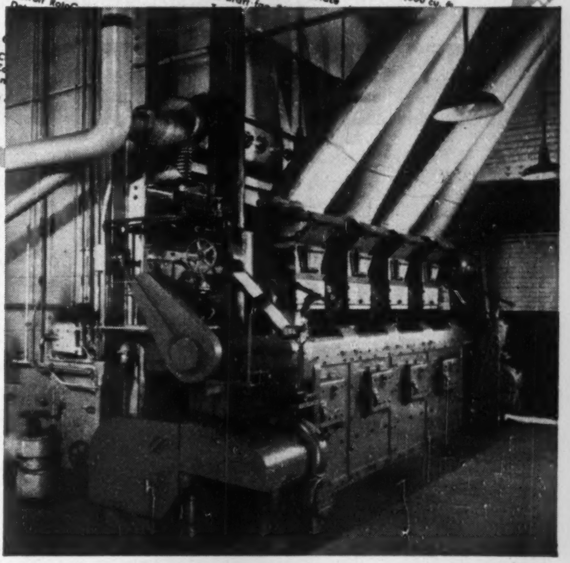
RESULTS OF TEST
at
MUELLER BRASS CO.
PORT HURON, MICH.

DETROIT ROTOGRATE STOKER
WITH ERIE CITY
Outdoor Type 3-Drum Boiler

Test Conducted by
CUMMINS and BARNARD INC.
CONSULTING ENGINEERS
ANN ARBOR, MICH.

Dates of test	June 27 and 28, 1950
Duration of test	21 hours—44 minutes
Location and Owner	Mueller Brass Co. Port Huron, Mich.
Maker and type of Boiler	Erie City Iron Works 3-Drum
Maker and type of Water Walls	Erie City Iron Works Bare Tubes—4 walls.
Maker and type of Superheater	Erie City Iron Works Pendant
Maker and type of Economizer	Foster Wheeler Corp. Extended surface-parallel flow
Maker and type of Stoker	Detroit RotoG
Maker of Dust Collector	
Maker of Fans	
Test Conducted by:	
Object of Test	

Boiler heating surface	8900 sq. ft.
Water wall heating surface	2700 sq. ft.
Superheater design	500° FST, present 750° FST, future
Economizer surface	7344 sq. ft., present 9792 sq. ft., future
Furnace volume	5,500 cu. ft.
Stoker, effective grate surface	
Forced draft fan	



Detroit RotoGrate Stoker applied to the 110,000 pound unit at Mueller Brass Co., Port Huron, Mich.

Results of tests of the Mueller Brass new steam generating unit by the consultants were most gratifying. They are typical of Detroit RotoGrate Stoker performance.

Especially important to you as a buyer is the *test of time.* Performance records of the RotoGrates in hundreds of plants—show high overall thermal efficiency, high availability and extremely low maintenance with all grades of coal.

Write for Detroit RotoGrate Bulletin

There is a Type and Size Detroit Stoker for Every Industrial Need

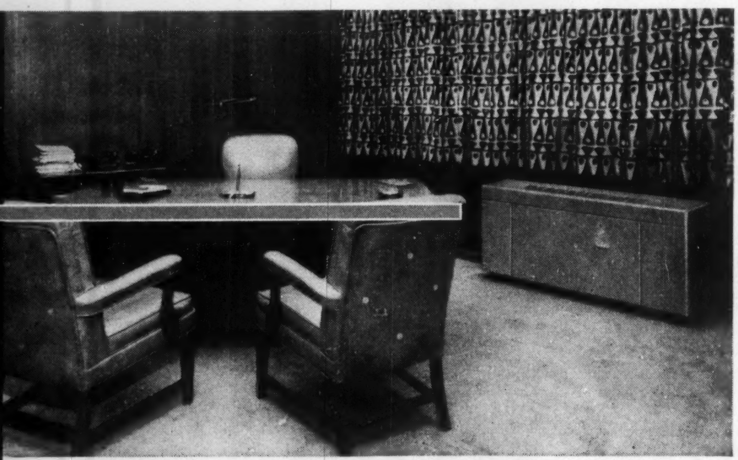
Detroit Stoker Company

General Motors Bldg., Detroit 2, Mich. • Works at Monroe, Mich. • District Offices in Principal Cities

REMOTAIRE

ROOM CONDITIONER

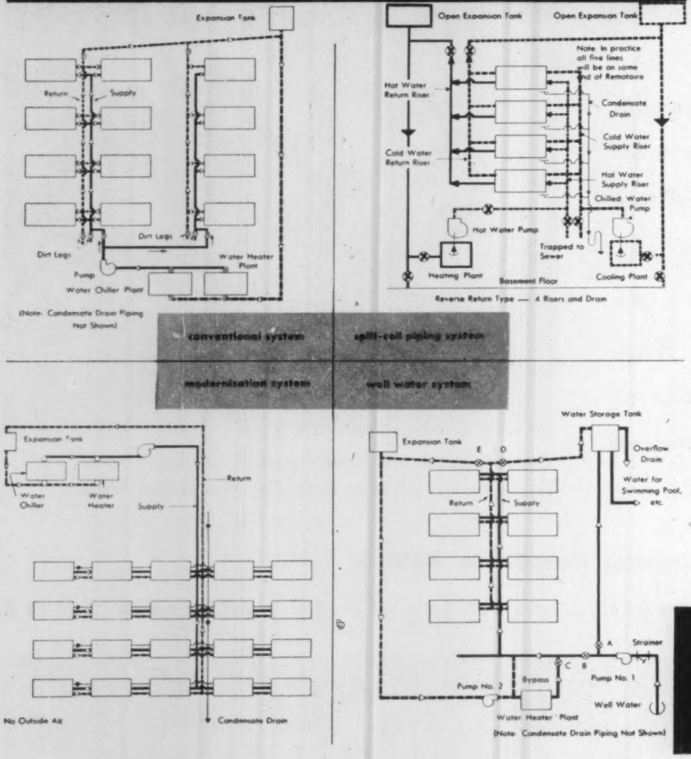
individual-room, remote-type units providing year 'round air conditioning for central plant multi-room installations



Adaptable to the one system that's most efficient, most economical for the job...

WALL APERTURE SYSTEM • INTERIOR VENTILATION SYSTEM • WELL WATER SYSTEM
SPLIT-COIL SYSTEM • MOTEL SYSTEM • RESIDENTIAL SYSTEM • MODERNIZATION SYSTEM

SOME TYPICAL PIPING ARRANGEMENTS FOR REMOTAIRE SYSTEMS:


Expansion Tank
Return
Supply
Dirt Legs
Dirt Legs
Water Heater Plant
Pump
Water Chiller Plant
(Note- Condensate Drain Piping Not Shown)
Open Expansion Tank
Open Expansion Tank
Note: In practice all five lines will be on same end of Remotaire
Hot Water Return Riser
Condensate Drain
Cold Water Supply Riser
Cold Water Return Riser
Hot Water Supply Riser
Chilled Water Pump
Hot Water Pump
Trapped to Sewer
Heating Plant
Basement Floor
Cooling Plant
Reverse Return Type — 4 Risers and Drain
conventional system
split-coil piping system
modernization system
well water system
Expansion Tank
Return
Water Chiller
Water Heater
Supply
No Outside Air
Condensate Drain
Water Storage Tank
Expansion Tank
E
D
Overflow Drain
Water for Swimming Pool, etc.
Return
Supply
A
Strainer
C
B
Pump No. 1
Pump No. 2
Bypass
Well Water
Water Heater Plant
(Note: Condensate Drain Piping Not Shown)

● The Remotaire room conditioner heats in winter, cools in summer . . . filters and circulates the air all year 'round. Using chilled water from a central water chiller for summer cooling and hot water from a central heating plant for winter comfort, the Remotaire system provides clean, draft-free, healthful comfort-conditioning for multi-room installations such as hotels, motels, schools, hospitals, office buildings and residences.

A Remotaire system is versatile. It can be adapted to the system of air conditioning that is best suited to each building . . . new construction or modernization. Ventilation can be provided in a variety of ways . . . several methods of piping arrangements are possible. Since units can be installed free standing or recessed partially or completely, they afford wide flexibility in architectural planning.

As part of a Remotaire system, individual unit control permits each room occupant to choose the temperature that suits him best without affecting adjoining rooms. And when the unit is not in use it can be completely turned off, thereby reducing operating costs.

For further details on the various Remotaire systems, write for descriptive literature.

AMERICAN-Standard
HEATING-COOLING SYSTEMS

American Radiator & Standard Sanitary Corporation, Dept. HP-14, Pittsburgh 30, Pa.

Serving home and industry

AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS • SUNBEAM AIR CONDITIONERS

Here are 6 reasons why you should specify **SPANG**® CW steel pipe for heating . . . air conditioning . . . plumbing

1 *Top Grade Steel*—Spang's steel requirements call for steel skelp made to rigid metallurgical and physical specifications, giving it inherent qualities that contribute to easy bending and threading of the finished pipe.

2 *Quality-Controlled Processing*—Automatic controls governing the three heat zones under predetermined conditions permit heating the skelp gradually and progressively to the correct welding temperature. The skelp is kept free of dirt and foreign matter.

3 *Strong, Clean, Uniform Welds*—Quality controlled heating to the right temperature assures highest quality welds and strength in the finished pipe. Skelp is air-blasted to remove loose scale prior to welding.

4 *Smooth, Clean Finish*—Spang CW is de-scaled inside and outside, producing a clean and neat-appearing surface and providing closer bonding and longer life for galvanized coatings.

5 *Uniform Diameter*—Careful sizing and straightening of quality-controlled Spang CW Pipe gives it a uniform diameter which makes it easier to thread, bend and fabricate on the job or in the shop.

6 *Complete Inspection and Testing*—Each length of Spang CW Pipe is inspected inside and outside; threads are checked for pitch, length and quality. Spang CW is pressure-tested and hydro-static-tested above actual required working pressures to check weld strength and pipe durability.

It's reasons like these that make Spang CW Steel Pipe the first choice of owners, architects, engineers and contractors who want the best in heating, plumbing and air conditioning systems. They know that Spang CW pays off in extra reliability, faster installations and lower costs.

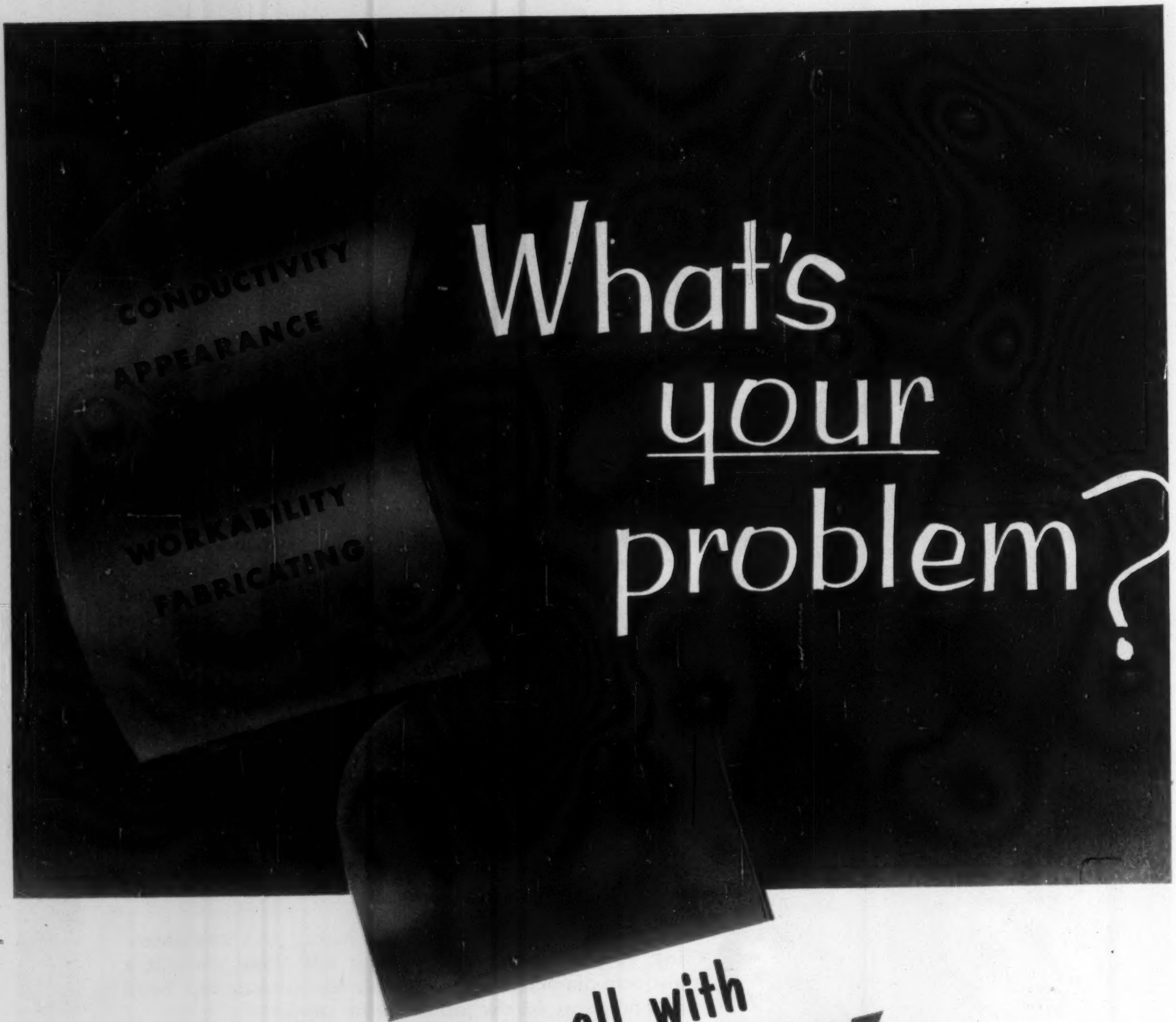
You can profit, too, by specifying Spang CW Steel Pipe at your local Spang distributor.

SPANG

SPANG-CHALFANT

DIVISION OF THE NATIONAL SUPPLY COMPANY

General Sales Office: Pittsburgh 30, Pa. District Sales Offices: Atlanta, Boston, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis.


CONDUCTIVITY
APPEARANCE
WORKABILITY
FABRICATING
What's your problem?

answer them **all** with

HUSSEY

COPPER & BRASS

Yes, all of these physical properties and all of these production characteristics are yours when you specify genuine Hussey Copper. Some of them are natural to copper but Hussey's controlled quality manufacturing methods assure them *all* in Hussey Copper. Make your specification HUSSEY COPPER.

C. G. HUSSEY & CO.
(Division of Copper Range Co.)
ROLLING MILLS AND GENERAL OFFICES
PITTSBURGH 19, PA.

HUSSEY
SINCE 1848

SEVEN COMPLETE WAREHOUSES
CHICAGO
CINCINNATI
CLEVELAND
NEW YORK CITY
PHILADELPHIA
PITTSBURGH
ST. LOUIS

"I STARTED SCHOOL AT 40

Typhoon Regional Training School, that is!"...

At the Typhoon training school they set up in my city I learned how to make more money out of air conditioning. I got straight-from-the-shoulder facts about the air conditioning business – how to estimate it, install it and service it – how to promote it, sell it and make dough on it. Everybody in my shop is going to graduate from this school–it's a real service Typhoon is doing for its dealers! No wonder they call Typhoon the most cooperative factory in the business.

You Profit 5 Ways with a Typhoon Franchise . . .

1. **CLOSE FACTORY COOPERATION**–You deal direct with the Typhoon factory. Every member of the organization is ready to pitch in and work with you personally–from the service manager or chief engineer right on up to the president.

2. **YOUR PARTNER, THE DISTRICT MANAGER** –when there's a complicated job to figure, when the sale hangs in the balance... your Typhoon district manager is Johnny-on-the-spot.

3. **TOPNOTCH ENGINEERING**–Typhoon units are ruggedly built with plenty of reserve capacity...they deliver full rated performance under peak load conditions.

4. **COMPLETE LINE** of packaged air conditioners from 2 to 25 tons. You always have just the size unit your customer wants – when he wants it – competitively priced. You're set up to handle any job in town -- efficiently, economically.

5. **REGIONAL TRAINING SCHOOLS**–intensive sales-engineering course by factory experts, conducted in your own territory. Every employee who attends is worth more money to you!

Air Conditioning Units 2 to 25 tons ● Multi-Packaged Systems up to 60 tons ● Evaporative Condensers ● Packaged Water Chillers ● Air Handling Units

And Typhoon leads in air conditioning for the home–with a complete line of year-round heating-cooling units and heat pumps.

Write for information about a Typhoon franchise in your territory

TYPHOON AIR CONDITIONING CO., INC.
794 Union Street
Brooklyn 15, N. Y.

TYPHOON
AIR CONDITIONING

Specialists in air conditioning since 1909

Typhoon Air Conditioning Co., Inc. P-1
794 Union St., Brooklyn 15, N. Y.

I would like to know more about the Typhoon Franchise.

Name________________________

Firm________________________

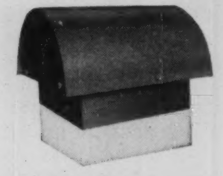
Address________________________

City__________Zone_____State_______

The MASSACHUSETTS Line®

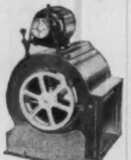
Our 75th year

Certified ratings authorized by NAFM

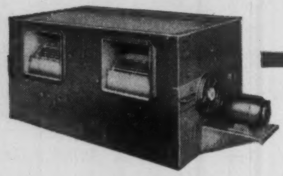


POWER ROOF VENTILATORS, Propeller Fan Type and Power Fixed (backward curve blade) offer a wide range of sizes. Bulletin No. 119 Propeller Fan Type Bull. 118, Power Fixed Fan Type.

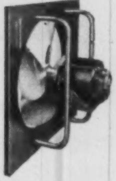
BLOWERS, Squirrel Cage (Forward Curve) and Power Fixed (Backward Curve) Fans available in a complete range of sizes, Single or double width. Bulletin 101 (PF) Bulletin 105 (S.C.).



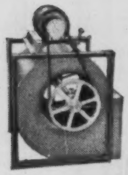
FURNACE FANS, Single, double or special width. All housing and wheel parts are die formed. Available as complete assemblies or parts only. Bulletin No. 115.



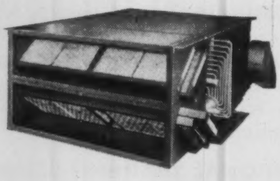
UNIT HEATERS, Blower Type floor or ceiling mounting arrangements, built in sections to facilitate efficient handling and erection. Popular sizes. Bulletin No. 112.



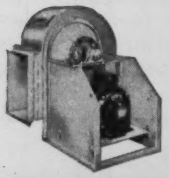
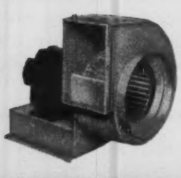
PROPELLER FANS, New Venturi-type Belt drive 24" to 48" wheel diameters, direct drive 12" to 30" diameters. A complete line of accessory items are available. Bulletin 117.



UNIVERSAL BLOWERS, A stock blower assembly made in single or double width, sizes 7" to 27" wheel dia. and features Universal discharge arrangement. Bulletin No. 110.



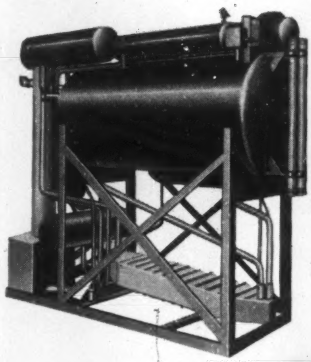
AIR CONDITIONING UNITS, Seven sizes available, ranging from 1,000 to 14,000 C.F.M. Vertical or horizontal mounting. Designed to combine cooling in summer, heating in winter. Bulletin 120.

VENTILATING SETS, Utility type. Belt drive wheel diameters 7" to 30". Direct drive 6" to 13½". Both available in popular competitive sizes, self contained completely packaged units. Bulletin 109.

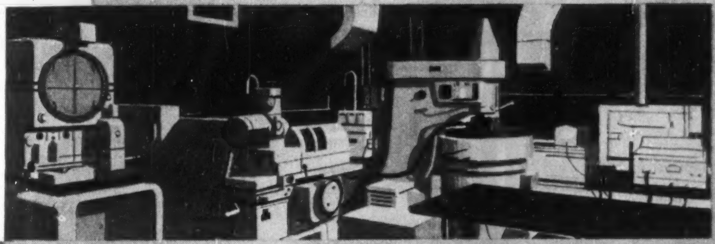
MASSACHUSETTS BLOWER DIVISION
The BISHOP & BABCOCK Mfg. Co.
4901 HAMILTON AVENUE • CLEVELAND 14, OHIO

use WASTE HEAT to control HUMIDITY and TEMPERATURE



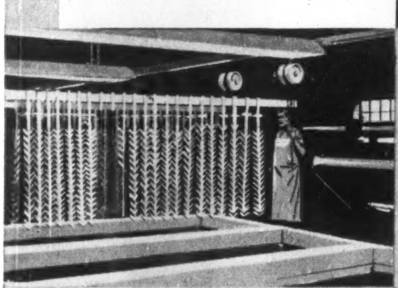
Servel 25-ton Water Chiller

No moving parts. Operates continuously at peak load with minimum maintenance on steam from any source.



Industrial Precooling ▲

Use Servel Water Chillers to precool air and increase capacity and improve performance of compressors and internal combustion machines. Opportunities for varied and profitable use are practically unlimited!



Process Cooling ▲

Continuous high efficiency and dependability makes Servel Water Chiller ideal for process cooling. Temperatures of liquids can be closely regulated and held to precision limits in manufacturing and formulating processes.

Air Conditioning ▶

Here's economical temperature and humidity control. Water is used for refrigerant. No compressors! Units may be placed for efficient zone control. Frequently, costly duct work can be completely replaced by simple piping arrangements.

The Servel absorption principle lets you use waste heat (or steam, from any source) to chill water for air conditioning or other cooling needs.

The flexibility and operating efficiency of the Servel Water Chiller is unmatched. *No moving parts design* means quiet, vibration-free operation, low upkeep. Capacity can be reduced by 50% with corresponding power savings. Compact size and low floor loading permit single or multiple installations in most advantageous locations.

Your investment is protected by a full five-year factory warranty!

Check these advantages against *your* cooling requirements. Your Servel dealer will supply details and engineering assistance, or mail coupon today!

Send coupon for details!

Servel

the name to watch for great advances in
AIR CONDITIONING ✓ REFRIGERATION

SERVEL, INC., DEPT HP-14, Evansville 20, Indiana

Send me specifications and full information on Servel Water Chillers.

Name____________________

Firm____________________

Address____________________

City__________ Zone____ State______

Here's the

BIG TRUTH*

about boilers

***You'll make more money selling boilers rated on nominal capacity to operate at "cruising speed" because you'll never have to "make good" a failure.**

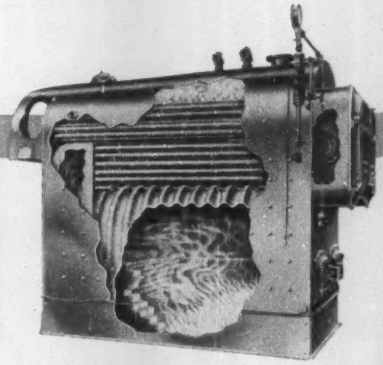
KEWANEE reserve plus rating

guarantees dependability, higher efficiency, lower costs, longer life—because it means "cruising speed" operation.

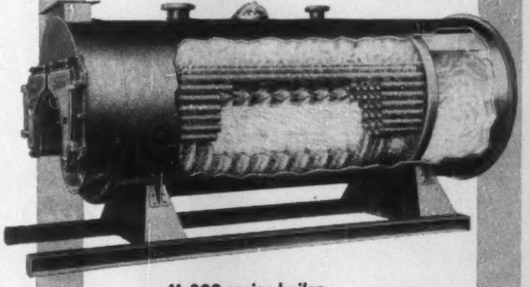
■ There's a lot of confusion in sizing boilers today because rating methods have not been brought into the open with a clear-cut definition. And that can cost you money because an inadequate boiler can mean a demand on you to make good. That's all changed with Kewanee Reserve Plus Rating. Here for the first time these truths are stated: Only nominal rated boilers with built-in reserve *safely provide* efficiency, low maintenance, dependability, longer life. Only nominal rated boilers *safely provide* for fluctuating loads, emergencies, expansion.

So when you sell or "bid" be sure you compare like examples —advocate boiler ratings based on nominal capacity and you'll never lose money because of making good a failure.

Follow the Kewanee Reserve Plus Rating Plan which is based on the commercial code of the Steel Boiler Institute. Kewanee Reserve Plus certifies 50% or more extra power for pick-up and additional capacity. Kewanee gives you complete data and dimensions, so you can realistically consider sizing requirements.



Kewanee type "C" boiler
with exclusive corrugated crown sheet
16 sizes for oil, gas or stoker
3650—42500 sq. ft. steam
5840—68000 sq. ft. water



M-800 series boiler

Here is the rugged "M-800" Series Scotch Boiler constructed in 13 sizes for high pressure steam 39 to 304 horse power and low pressure 15 lb. steam or 15 lb. water.

KEWANEE BOILERS

You can count on KEWANEE *engineering*

KEWANEE-ROSS CORPORATION · KEWANEE, ILL.
Division of American Radiator & Standard Sanitary Corporation

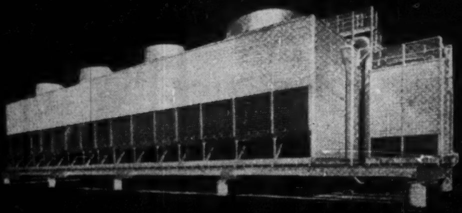
Serving home and industry · American-Standard · American Blower · Church Seats & Wall Tile
Detroit Controls · Kewanee Boilers · Ross Exchangers · Sunbeam Air Conditioners

1st in Creative Thinking

LILIE-HOFFMANN

Cooling Towers, Inc.

Exclusive Builders of the
World's Finest Cooling Towers
for 56 Years



GENERAL OFFICES: 4239 DUNCAN AVE. · ST. LOUIS, MO.
Offices in All Principal Cities

"Good personal service from local representative."
Contractor*

"Quiet, trouble-free operation sold us."
Distributor*

". . . your complete willingness to cooperate."
O.E.M.*

". . . quality material—very competitive prices."
Contractor*

PVB EXHAUST FAN

For continuous movement of dusty, humid air in factories, warehouses, foundries, etc. Totally enclosed ball-bearing motor. Motor pulley adjustable for lower fan speeds. Vertical or horizontal mounting. Heavy-duty industrial type. Quiet.

PVS EXHAUST FAN

Four lag screws mount it horizontally or vertically. Ball-bearing motor is totally enclosed. Quickly exhausts smoke, fumes or odors. Fans furnished with one- or two-speed controllers. Easily installed in round or square opening.

"tops in design, materials and workmanship"

says an ORIGINAL EQUIPMENT MANUFACTURER

Peerless "SMOOTHEST PERFORMERS ON THE MARKET"*

Dealers, distributors, contractors and equipment manufacturers tell us that they go "all-out" for Peerless fans and blowers and the Peerless way of doing business. Most of them save money by handling ONLY Peerless. Take these two Peerless exhaust fans—the PVS and PVB . . . Each unit is designed, manufactured and assembled by Peerless . . . all responsibility is fixed at one source. Complete control permits Peerless to match and balance motor and fan perfectly for smooth, quiet, efficient performance that **eliminates call-backs** . . . simplifies deliveries . . . assures immediate and complete backing of the famous Peerless Guarantee . . . **sets and pegs prices competitively.** Specifying and installing Peerless fans or blowers gives you the all-around advantages of customer satisfaction, easy installation, no call-backs and bigger profits . . . there's no substitute for Peerless!

On your next installation specify Peerless. If you need technical data or assistance call us. We'll see that you get it quickly!

*All quotes from recent Peerless correspondence.

FAN AND BLOWER DIVISION

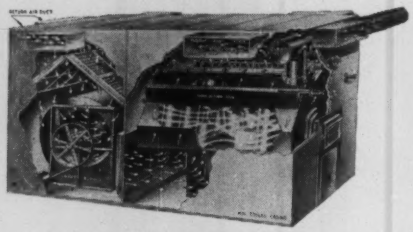
THE PEERLESS ELECTRIC COMPANY
1409 WEST MARKET ST. • WARREN, OHIO

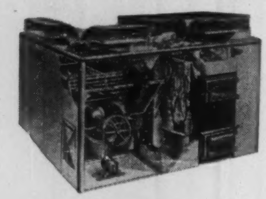
Peerless Electric

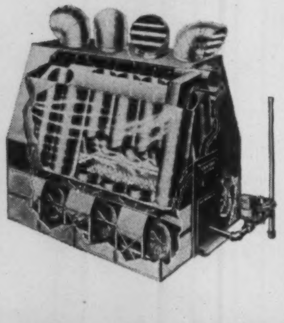
Specify CAMPBELL HEATERS FOR BIG WARM AIR JOBS

For easy installation, exceptional fuel economy and long, dependable service, specify Campbell. We will be glad to assist you on any large heating installation. Send us your preliminary plans and ideas and we will help you work them out.

H SERIES Oil & Gas Fired


8000 SERIES For All Fuels


HALF SERIES Stoker or Hand Fired


8000 UNIT HEATER For All Fuels

SPECIFICATIONS and DIMENSIONS

Unit No.	Output Capacity Btu/Hr†	Heating Surface Sq Ft	Btu per Sq Ft Heating Surface	BLOWER‡			MAX. FUEL RATE				Height	Length	Width
				Normal cfm 135° Dischg. Temp.	Assumed External Static In. Water	Motor hp	Oil gph	1000 Btu Gas cfh	LP Gas gph	Coal Lbs. per Hr	in.	in.	in.
H Series Oil & Gas Fired for Large Residences, Small Churches, Schools, Etc.													
H200	200,000	100	2000	2600	½	½	1.8	250	2.5		52	75	41
H250	250,000	125	2000	3300	½	¾	2.2	312	3.1		57	85	41
H300	300,000	136	2200	4000	½	¾	2.7	375	3.8		61	87	50
H350	350,000	152	2300	4600	½	1	3.1	437	4.4		61	87	50
H400	400,000	167	2400	5300	½	1	3.6	500	5.0		61	87	50
H500	500,000	200	2500	6600	¾	1	4.5	625	6.3		74	91	60
H600	600,000	240	2500	8000	¾	1½	5.4	750	7.5		72	97	60
H700	700,000	280	2500	9200	¾	1½	6.3	875	8.8		72	104	80
8000 Series Oil, Gas, Stoker or Hand Fired for Large Schools, Churches, Etc.													
8075	840,000	280	3000	11,000	1	3	7.5	1050	10.5	100	93	134	76
8100	960,000	320	3000	12,500	1	3	8.6	1200	12.0	114	95	153	76
8125	1,080,000	360	3000	14,100	1	3	9.7	1350	13.5	129	97	171	76
8150	1,320,000	440	3000	17,300	1	5	11.8	1650	16.5	157	98	195	76
8175	1,440,000	480	3000	18,900	1	5	12.9	1800	18.0	171	99	202	76
8200	1,800,000	600	3000	23,600	1	5	16.1	2250	22.5	214	120	216	94
8250	2,250,000	750	3000	29,500	1	7½	20.1	2810	28.0	268	120	243	94
8300	2,700,000	900	3000	35,400	1	7½	24.1	3380	33.8	320	132	251	104
8350	3,150,000	1050	3000	41,300	1	10	26.1	3940	39.4	375	150	251	114
Half Series Stoker or Hand Fired for Small Churches, Schools, Stores, Etc.													
930½	310,000	104	3000	4050	½	¾				37	60	72	92
936½	363,000	121	3000	4750	½	¾				43	60	78	92
940½	399,000	133	3000	5200	½	1				48	60	82	92
944½	435,000	145	3000	5700	¾	1½				52	60	86	92
948½	486,000	162	3000	6350	¾	1½				58	60	90	92
Rectangular Tube Radiator													
9445	537,000	179	3000	7000	¾	2				64	60	92	92
9485	550,000	183	3000	7200	¾	2				66	60	96	92
8000 Series Unit Heater—Oil, Gas, Stoker or Hand Fired—for Large Industrial Buildings													
U8075	840,000	280	3000	11,000	Consult our Engineers if duct system is to be used.	2–¾	7.5	1050	10.5	100	93	80	76
U8100	960,000	320	3000	12,500		2–¾	8.6	1200	12.0	114	95	93	76
U8125	1,080,000	360	3000	14,100		2–1	9.7	1350	13.5	129	97	105	76
U8150	1,320,000	440	3000	17,300		2–1½	11.8	1650	16.5	157	98	118	76
U8175	1,440,000	480	3000	18,900		2–1½	12.9	1800	18.0	171	99	130	76
U8200	1,800,000	600	3000	23,600		2–2	16.1	2250	22.5	214	120	137	94
U8250	2,250,000	750	3000	29,500		2–3	20.1	2800	28.0	268	120	157	94
U8300	2,700,000	900	3000	35,400		2–3	24.1	3380	33.8	320	132	157	104
U8350	3,150,000	1050	3000	41,300		2–5	26.1	3940	39.4	375	150	157	114

† Based on 80% thermal efficiency for oil and gas and 70% for coal. Add 10% to 35% over calculated heat loss for pick-up load and 10% to 15% for duct radiation losses. The higher figure is preferable for best operating economy and life of the equipment.

‡ For other air volumes and static pressures consult our Engineering Department.

For Complete Specifications, See *Sweet's Catalog Service*

CAMPBELL HEATING COMPANY

Des Moines 17, Iowa

Standard is always first with the finest

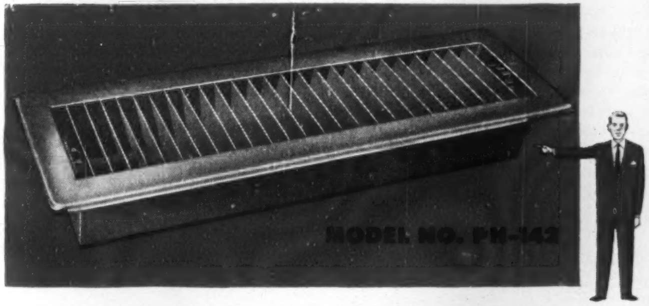
here it is...
the floor register everyone wants!

STANDARD'S NEW

PERIMETER FLOOR REGISTER

with Standard's exclusive

Dialamatic Control



Duct opening	Overall of Louvre Box	Overall of Face	Open Area	Depth of Box
2¼" x 14"	2⅛" x 13¾"	3¾" x 15⅜"	80%	2⅛"

Standard's new. exclusive dialamatic control gives you POSITIVE HEAT CONTROL. The set screw arrangement means easy balancing, trouble-free operation!

SPECIFICATIONS

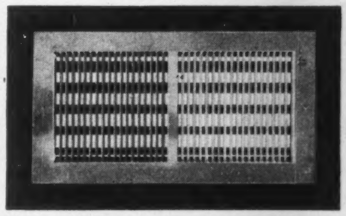
The blades of model PH-142 are fabricated of 16 gauge steel, the blades are set in a fixed-fan angle degree for even deflection. The Frame is of one piece, 18 gauge steel construction. The Louvre box fabricated of 16 gauge steel. Packed one to a box, and 20 to a master carton. Comes handsomely finished in gleaming, durable metallic-lustre finish.

THE NEW, IMPROVED

multiple valve

REGISTER

Has Horizontal Multiple Valve Louvres, and $\frac{3}{16}''$ turned down edge for flush sidewall installation. The attached sponge rubber gaskets are an *extra* feature that prevents escape of air and chipping of wall surface. The Louvres are adjustable so that the flow of air may be directed either downward, straight forward, upward, or to complete shut-off.



MODEL NO. 331

Metallic Finish standard finish on this style

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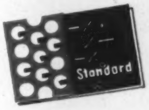

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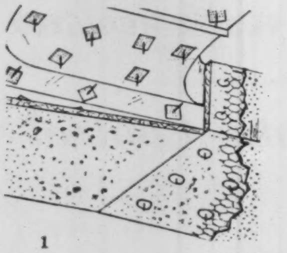
COMPANY NAME

Miracle Adhesives Corporation

Devices, Inc. (Affiliate)
Manufacturer of Miracle Surface Anchors
214 East 53 St., New York 22, N. Y.
Representatives in all Principal Cities and in Canada

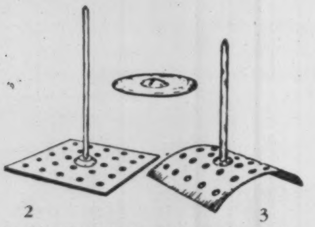
MIRACLE SURFACE ANCHOR METHOD CUTS COSTS . . . SAVES TIME

Miracle Surface Anchors consist of perforated metal plates 2 in. x 2 in. or 2¾ in. x 2¾ in.—to the center of each is welded a nail, bolt, spindle, prong, or threaded stud. These Anchors are zinc and dichromate finish to resist corrosion. (Fig 2, 3 and 6.)



1

Fig. 1: Attaching Corkboard with Miracle Spindle Anchors to Ducts



2 3

Fig. 2: Miracle Spindle Anchor and Washer
Fig. 3: Miracle Curved Spindle Anchor for Convex surface of corrugated metal

Miracle Spindle Anchors—When attached to ducts, walls, ceilings, ship hulls, deck heads, etc., will firmly support various types of insulation, such as Cork, Batt and Fiber Glass, by impaling the insulation (and wire mesh, if any) on the spindle (Fig. 1). Self clinching washers to fit over the spindles are available (Fig. 2). Spindle Anchors are also made on a curved plate for attaching to convex surface of corrugated metal or asbestos board (Fig. 3)

4

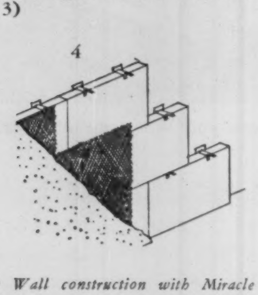


Fig. 4: Wall construction with Miracle Pronged Anchors

5

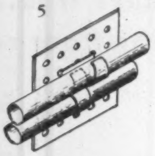


Fig. 5: Miracle Pronged Anchors are also used for supporting small cables, tubing, air lines, etc.

6

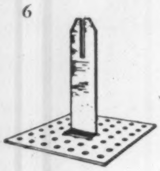


Fig. 6: Miracle Pronged Anchor

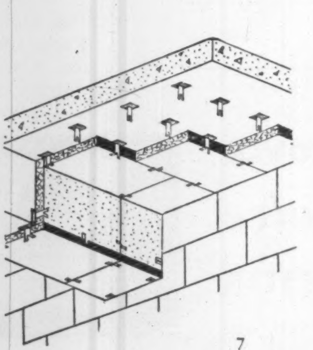


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Fig. 7: Ceiling construction with Miracle Pronged Anchors

Miracle Pronged Anchors—When attached to ducts, walls, ceilings, etc., support foam glass and other types of block insulation. Pronged Anchors are set between rows of block insulation and when the latter is to be left exposed, prongs are bent in reverse direction over the blocks. When wire mesh is to be added for mastic finish, one prong of each Anchor is bent over the block insulation—the other prong penetrating the wire mesh and then bent over it before applying mastic (Figs. 4 and 7).

Advantages:— 1. Cut costs because of faster application. 2. No wiring—no metal corner beads—no preliminary spotting of ducts or insulation with mastic necessary. 3. Ideal for cumbersome installations such as fan housings and similar equipment.

MIRACLE "Z" CLIPS

Miracle "Z" Clips consist of 2 in. x 2 in. or 2 in. x 4 in. perforated 20 gauge steel. "Z" Clips, because of their hinged construction, allow for any irregularities in the surface to which they are bonded. "Z" Clips provide an effective and economical means of attaching wallboard, plasterboard, or insulation board to the inside of exterior walls when an air space is required between the wall and the board. The "Z" Clip method completely eliminates necessity for studs, or furring strip (Fig. 8, 9 and 10).

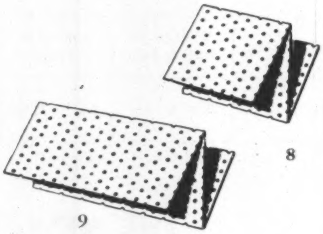

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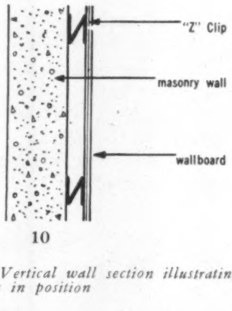
Fig. 8: Cat. No.—Z22 Dimensions—2 in. x 2 in.

Fig. 9: Cat. No.—Z24 Dimensions—2 in. x 4 in.



10

Fig. 10: Vertical wall section illustrating Miracle "Z" Clips in position

Adhesives:—For Anchor installations use Miracle Anchor Adhesive for temperatures minus 20 F to plus 250 F or Miracle RT-1000 for temperatures 250 F to 450 F. For cold storage or extra low temperatures use Miracle NP-153 or RT-1000.

NEW TRIMLINE

baseboard... RADI-VECTOR* by VULCAN

(RESIDENTIAL)

Price

Vulcan TRIMLINE radiation costs less. New TRIMLINE features save time and money. Fewer joints are necessary . . . less accessories . . . all parts mount on one piece top and back. Dampers installed on the job, anywhere, any time. Front cover snaps on after speedy, easy, low cost installation.

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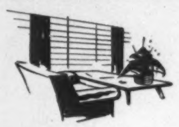
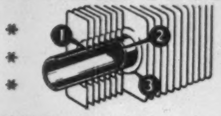


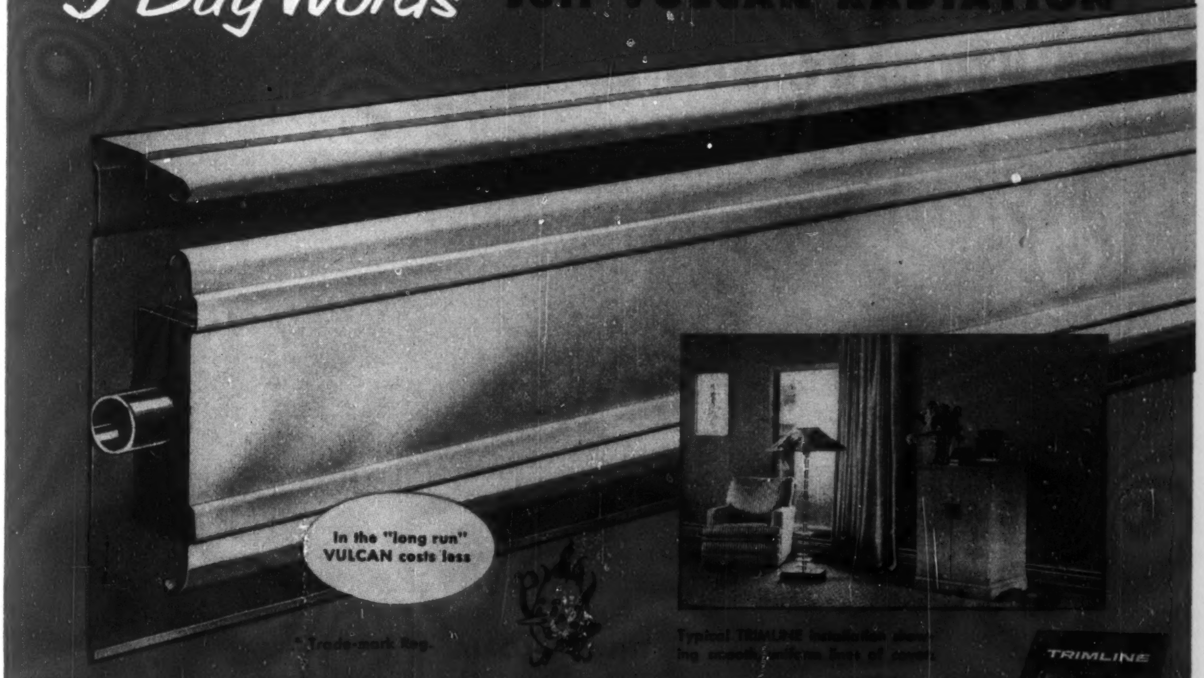
Vulcan TRIMLINE radiation provides the two most used types of heat. Radiant heat for floor level comfort . . . convection heat for even distribution of air throughout the "comfort zone." Trimline continuous inlet and outlet slots assure more heat output. Floor to ceiling temperature differential is only three degrees. The utmost in heating comfort.

Permanence



TRIMLINE fin-tube radiation is rugged. Constructed of quality pressure tube or copper water tube. *(1) fins imbedded to promote best heat transfer. *(2) steel pressure tube, ends IPS threaded or chamfered for welding. *(3) fins offset for rigidity. Insures permanent bond between primary and secondary surfaces. Vulcan TRIMLINE radiation lasts a LIFETIME.

3 "Buy Words" sell VULCAN RADIATION



* Trade-mark Reg.

Typical TRIMLINE installation showing smooth, uniform lines of cover.

Also made in Canada under Trade Name of Heat Radiation by Vapor Car Heating Co. of Montreal

The VULCAN Radiator Co.

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FREE . . . write for New TRIMLINE Catalog No. 54 (residential), No. 625 A, Linovector (commercial).

Representatives in Principal Cities

→ Over 28 years a leader in Fin-Tube Radiation

Complete I=B=R Ratings

This is an ordinary motor driven pump...
MAGNETIC CIRCULATOR
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THIS IS THE REVOLUTIONARY, NEW *Dynapump*

The difference is 10 exclusive features

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4. **Suitable for high pressures or high vacuums.**
5. **Corrosion resistant stainless steel construction.**
6. **No bearings or other parts to lubricate.**
7. **No couplings or alignment problems.**
8. **No contamination of fluids pumped.**
9. **Extremely compact and light weight.**
10. **Easily mounted in any position, any angle.**

All these exclusive features at no extra cost—and at a price lower than most ordinary centrifugal pumps!

The new DYNAPUMP eliminates 90% of the difficulties encountered with conventional pumps! A rotating magnetic field drives the impeller . . . eliminates drive shaft, shaft seal, stuffing box . . . causes of most pump failures. This unique magnetic drive has been proven on thousands of critical applications. Fractional horsepower units now available. For low first cost, minimum maintenance cost, easy installation, plus superior pumping performance, specify DYNAPUMP! Full information is given in Bulletin No. P-11-53 . . . send for your copy.

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"OUR 38TH YEAR OF QUALITY PRODUCTS"

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people who know think ………

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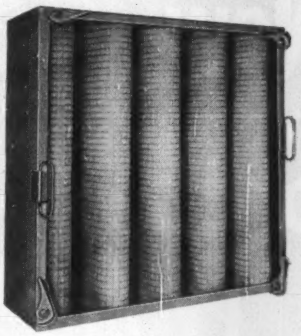


THE NEW CA-24 DYCON FILTER

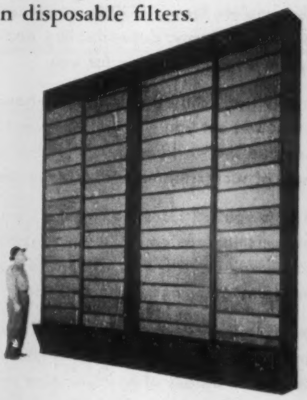
An un-oiled blanket of selected synthetic fibers, supported in a sturdy metal frame, that removes and retains dust particles by means of an accumulated static electric charge. "Deep-bed" characteristics of the Dycon filter increases its dust-holding capacity to 3 or 4 times that of conventional dry-type filters. Vacuum cleaned or rinsed for repeated reuse. Result: important economy.

TYPE HLA E-Z-WASH AIR FILTER

The all-aluminum, permanent type that has greater dust-holding capacity than any other one-inch filter . . . even greater than any 2-inch throw-away filter.

TYPE EW E-Z-WASH UNIT FILTER

A cleanable air filter which requires no hot water, detergents, or special cleaning tanks . . . gives you more filtering efficiency for a longer time and costs less in the long-run than disposable filters.



SELF-CLEANING AUTOMATICS

The filter with ferris-wheel type of operation of the multi-celled filter curtain that eliminates reversing media to direction of air-flow in the leaving-air curtain. Thus, no dust can be blown back into the clean-air stream. Patented media design and unique "soak-then-flush" action provide thorough self-cleaning.

E-Z Oil
CONTINENTAL
Air Filter Oil
Made for Continental Air Filters, Inc.
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E-Z-OIL PRESSURE BOMB

For simple finger-tip reoiling of unit filters after cleaning.

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Prepare Now for the Profitable Jobs...

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AIR CONDITIONING AND REFRIGERATION EQUIPMENT

This complete line of CURTIS equipment assures highest possible efficiency, dependability and quality . . . at a price that is profitable for you.

Not only will you be equipped to handle any installation but you will be selling equipment that is accepted the world over, and that is proven by 100 years of successful manufacturing experience.

To help you sell more CURTIS Air Conditioning and Refrigeration equipment, it is nationally advertised in *Saturday Evening Post, Time* and *Newsweek*, plus many other national magazines.

For immediate information on how to make your operation more profitable, mail this coupon for details of how you may secure a direct factory franchise:

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of Curtis Manufacturing Company
1950 Kienlen Avenue, St. Louis 20, Missouri
I am interested in direct factory franchise. Send complete details.

Company Name..

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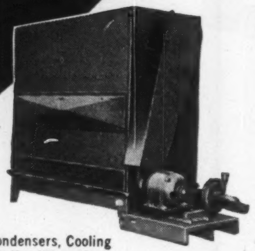
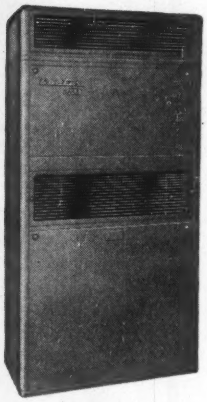
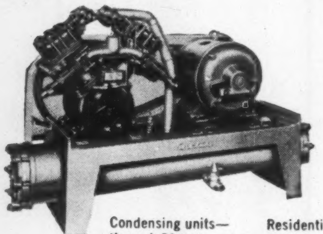
Signed..



Evaporative Condensers, Cooling Towers and Air Handling units to match

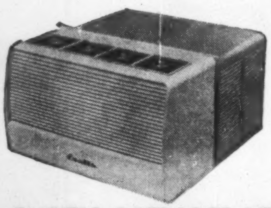


Packaged Air Conditioners—2, 3, 5, 7½, 10 and 15 tons



Condensing units—through 50 tons

Residential cooling and heating units



New 1954 Curtis Room Air Conditioner in three popular sizes.

CURTIS REFRIGERATING MACHINE DIVISION
1950 Kienlen Ave. — St. Louis 20, Mo.

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BURNERS *for All* HEATING *and* POWER NEEDS

SERIES STV GAS BURNER

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Ideal for heating boiler installations. From one head to fifty heads. Quiet, efficient and economical operation.

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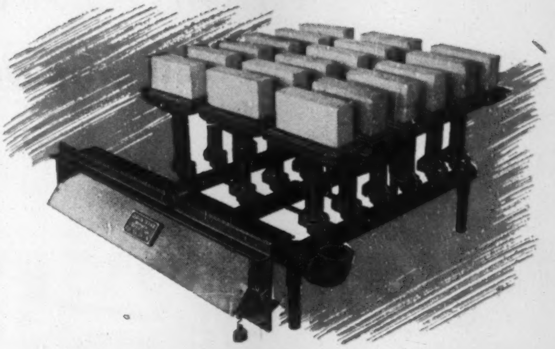
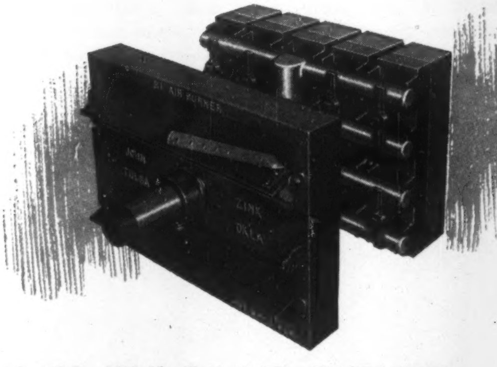


SERIES VR VERTICAL GAS BURNER

4" to 4 oz.

This burner is one of the "upshots" or vertical radiant type with multiple burner heads so designed as to entrain a certain amount of primary air from the total air entering through the louvre. The "VR" burners are especially designed to operate in boilers having low draft and small combustion space.



SERIES "R" BI-AIR BURNER

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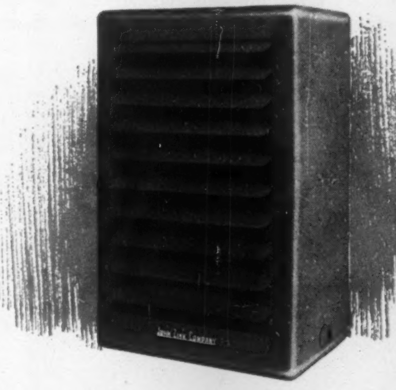
For all types and sizes HEATING BOILERS and small Power Boilers — JOHN ZINK offers the Series "R" Bi-Air short flame, Gas Burner with Multi-Jet burners, having refractory semi-venturi mixing throats, with a separate gas orifice to each throat. Capacities to meet your requirements.

Especially adapted for installing in boilers having very low draft and small combustion space.



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The John Zink UHS Gas-fired fan type suspended heater is a complete, packaged unit and fully automatic. A. G. A. approved for natural, mixed, manufactured or LP Gas.

For industrial applications, J.Z. Central Heating Units can be installed on a shelf or balcony, as a suspended heater or as a duct heater. Ratings from 65,000 Btu/hr.

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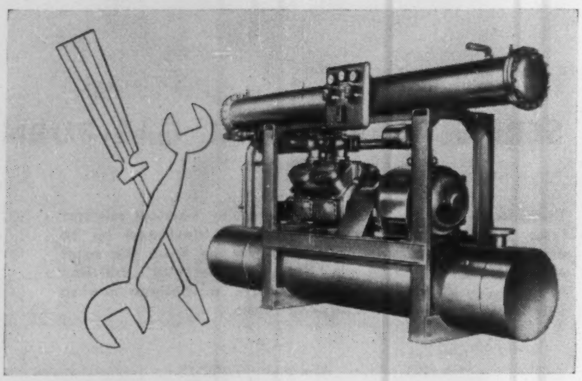
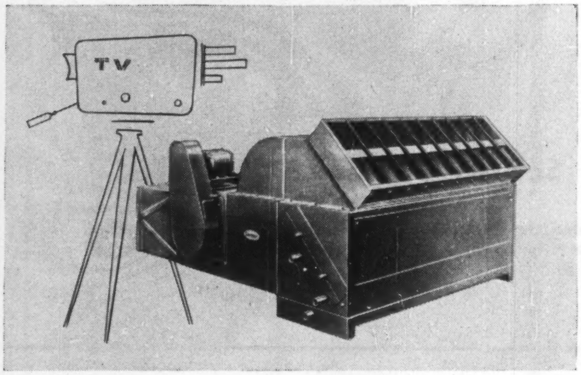
4 POINTS AND 8 EXAMPLES

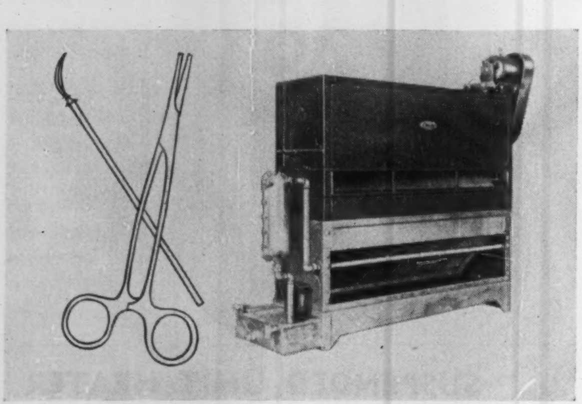
tell why you're better off with Carrier!



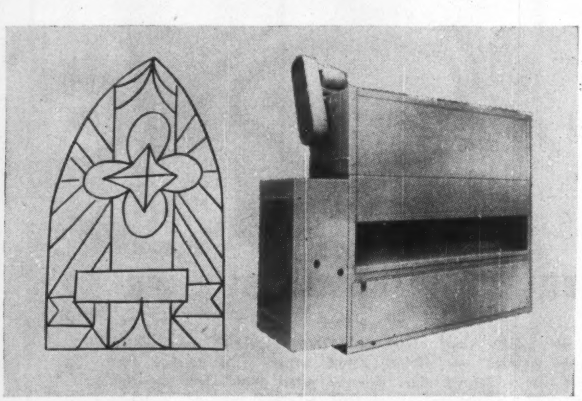
EASY INSTALLATION. Carrier's new 75-hp reciprocating water-cooling system comes from the factory completely assembled, ready for water and electric line connections. The new unit is compact, too — fits easily through an average-size doorway.



ZONES FOR TV. WFBM, Indianapolis, stars a Carrier Zoning Weathermaker. Show by show, comfort keeps pace with the programming through eleven individually controlled zones. Works equally well in office suites, department stores, motels.

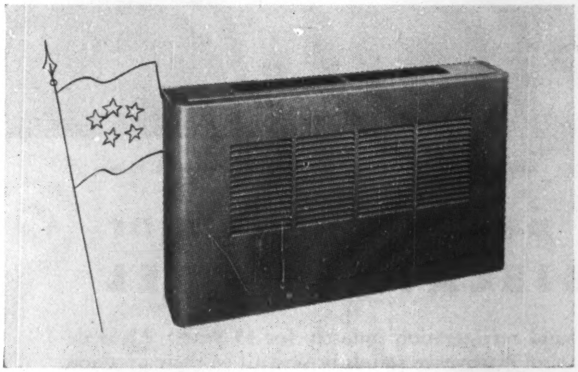


IT'S THE HUMIDITY that's important in hospital operating suites, in IBM equipment rooms and in scores of laboratories and textile mills. *Exact* humidity control calls for *exactly* the right air conditioners: the Carrier Industrial Weathermaker, for one.

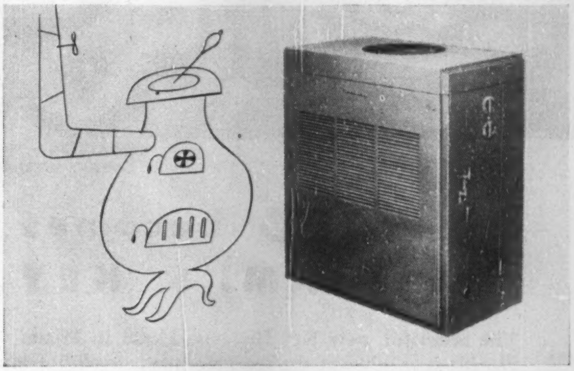


BIG COOLING PACKAGE. Carrier's 20-hp Commercial Weathermaker has the features of a built-up system, yet it's a compact, self-contained unit—factory assembled and tested. Ideal for churches, stores, banks, or wherever space is a problem.

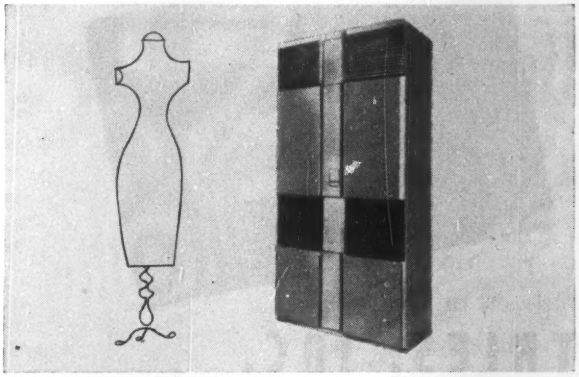
1. *The Carrier name is easiest to sell because customers know and respect it.*
2. *In the Carrier line-up there's the* right *equipment for every job you tackle.*
3. *The Carrier record of performance is your guarantee of the best possible results.*
4. *The Carrier technical team backs you up on every phase of the job.*



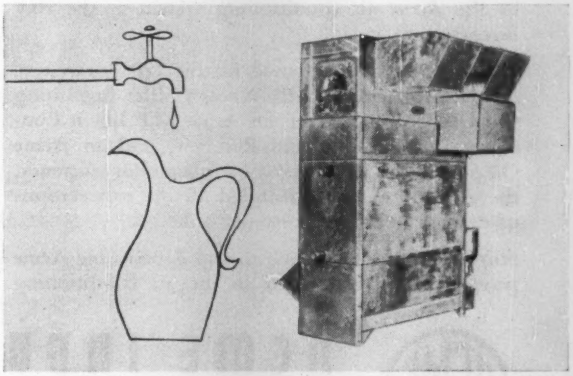
PROVED PERFORMER. From scores of banks and hospitals to the Pentagon Building in Washington, Carrier under-the-window Duct-type Weathermaster installations have proved their ability to provide quiet, vibrationless, low-cost cooling and heating.



NEW LIFE FOR OLD HEATING SYSTEMS. A new 2-ton Weathermaker teams up with existing warm-air heating systems—or operates on its own—to provide low-cost cooling for homes and stores. It's as flexible as a contortionist, offers many combinations.



BEST SELLER in the fast-selling packaged Weathermaker line is the 5-ton unit. One out of four goes into an office. Stores offer a wide market, too—particularly clothing and drug stores. It's a favorite in shops, factories, banks and funeral homes.

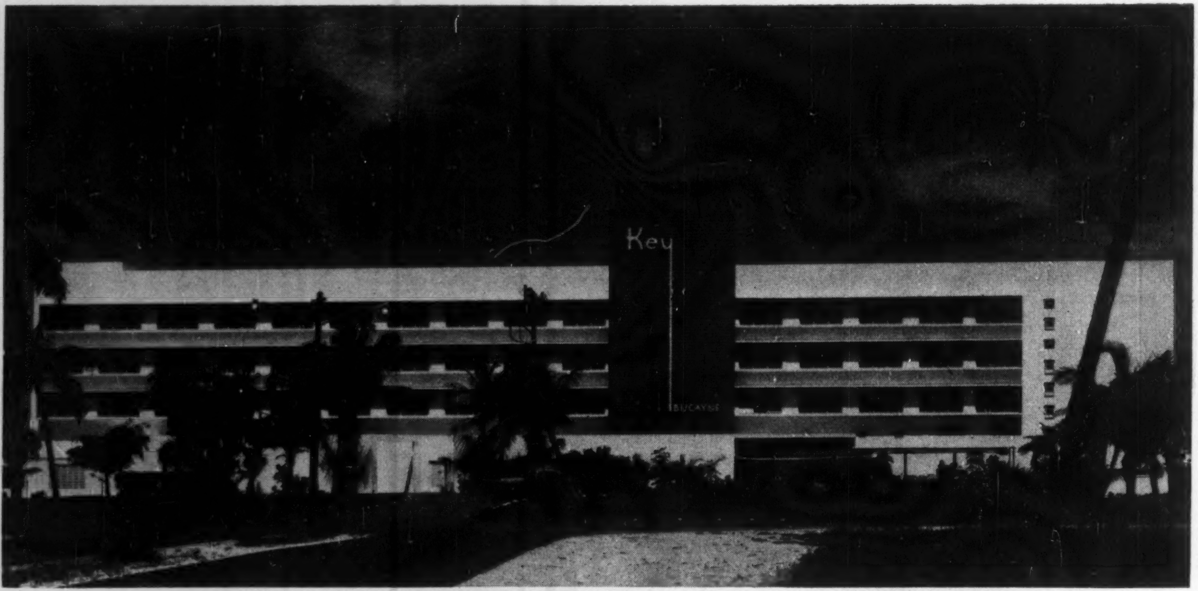


WATER SHORTAGES are no great concern where Carrier Evaporative Condensers are used with refrigerating compressors to take the place of water-cooled condensers and cooling towers. They can be located indoors or out. Capacities, 10-85 tons.

AIR CONDITIONING • REFRIGERATION • INDUSTRIAL HEATING

Carrier

Carrier Corporation, its distributors and dealers,
stand ready and willing to work with you in any phase of
air conditioning. Call your local Carrier distributor or dealer.
Or write to Carrier Corporation, Syracuse, New York.



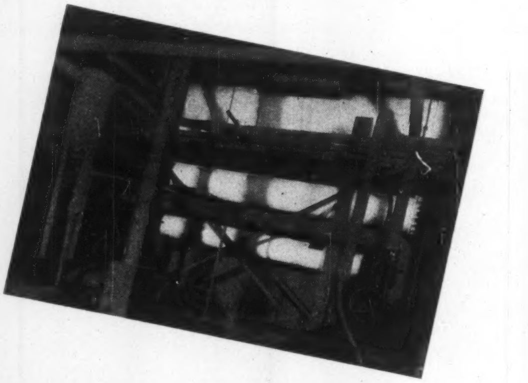
CONTRACTOR — Hill York Corp.
CONSULTING ENGINEER — Sasnett & Bennett
ENGINEER — L. H. Stoll
ARCHITECT — Herbert A. Mathes

Acme becomes a permanent tenant at MIAMI'S KEY BISCAYNE HOTEL

The beautiful, new Key Biscayne Hotel in Miami, Florida is another of the recently constructed hotels that is following the trend toward 100% air conditioning. Hotel owners and managers realize that the public demands more than the comforts of home when it goes on a trip or vacation. It gets them in the cool, comfortable environment offered by the Acme air conditioning system at the Key Biscayne.

The Acme equipment used in this 120 ton system includes an Acme Dry-Ex Water Chiller furnishing 570 GPM of 46° water, an Acme STF Freon Condenser, an Acme Liquid Receiver, and an Acme Oil Separator. Engineered for maximum efficiency, the Acme system has fulfilled all the expectations of management and customer alike.

Sturdy, efficient, economical, and dependable Acme products have been used in the air conditioning and refrigeration industry for 35 years. Acme design experience stands behind all of their products. These reasons make it wise to specify Acme on any air conditioning installation.



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Mfgs. of a complete line of Air Conditioning and Refrigeration Equipment

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Evaporative Condensers
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Heat Exchangers, Oil Separators

Shell and Tube, Shell and Coil Condensers

Receivers, Pipe Coils

Packaged Liquid Chillers to 225 tons

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Remote Room Conditioner

Continuously serving the air conditioning and refrigeration industry since 1919

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NESBITT
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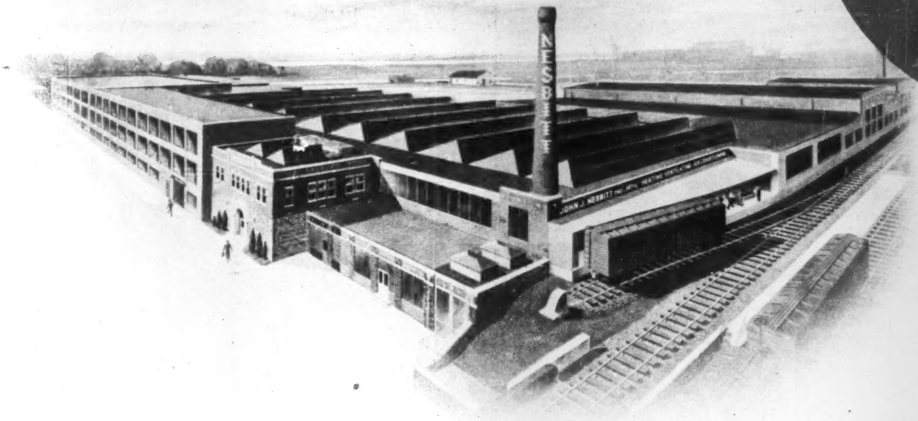

Within the NESBITT CIRCLE you find SECURITY and SATISFACTION

Be you architect, engineer, contractor, owner or user, your heating and ventilating needs may be summed up as two: the comfort that comes of good performance; and the safety that lies in choosing dependable equipment. Is it not so? These needs are met within the Nesbitt circle. Small at first, the circle embraced (in 1917) only a better method for heating and ventilating schoolrooms. Today the Nesbitt circle includes more fine products than you may be aware of.

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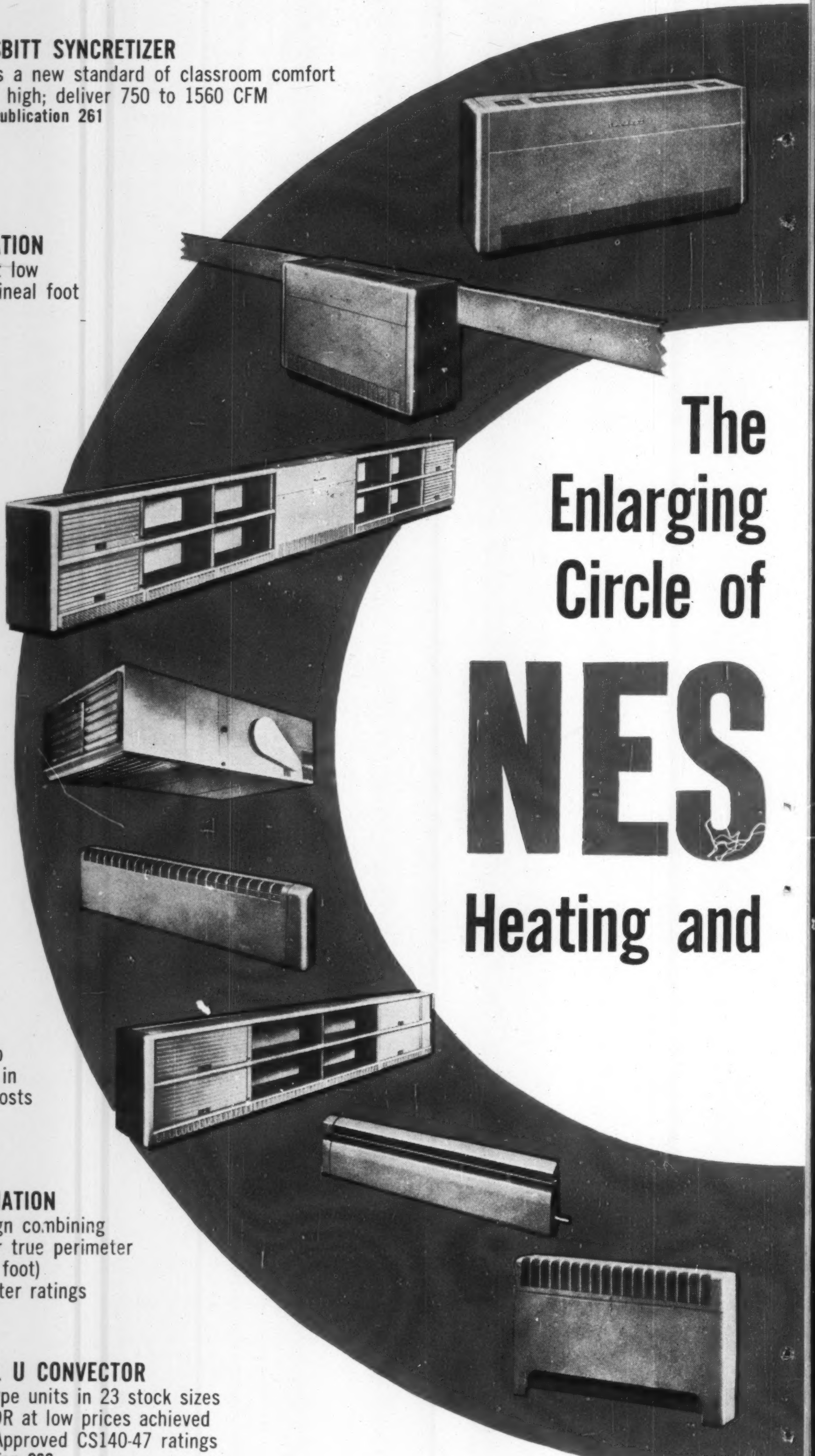


The Enlarging Circle of NES Heating and

THE NESBITT SYNCRETIZER

The unit ventilator that sets a new standard of classroom comfort
Models 32″ and 28″ high; deliver 750 to 1560 CFM
Publication 261

SYNCRETIZER AND WIND-O-LINE RADIATION

The system of positive protection against low temperature surfaces. 450, 550 and 700 Btu/lineal foot
Publication 265 and 261 Sec. W

THE NESBITT PACKAGE

Nesbitt Syncretizer, Storage Units and Wind-o-line Radiation integrated for classroom comfort, beauty and utility
Publication 261 Sec. G

THE NESBITT THERMOVENT

Now available with acoustically treated discharge section for quieter operation in capacities from 1250 to 15,000 CFM
Publication 270

NESBITT SILL-LINE RADIATION

In the first enclosure design that harmonizes with modern interiors while preserving all the advantages of perimeter strip heating
Capacities: 1250 to 2290 Btu/lineal foot
Publication 271

STORAGE UNITS WITH SILL-LINE

Combining the advantages of perimeter strip heating with the utility of metal storage units in an engineered package at low mass-production costs
Capacities: 1315 to 2265 Btu/lineal foot
Publication 261 Sec. S

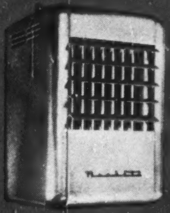
NESBITT BASEBOARD RADIATION

A new approach in baseboard design combining unusual beauty and ample capacity for true perimeter heating (4.1 sq. ft. EDR per foot)
I-B-R approved steam and hot water ratings
Publication 272

NESBITT MODEL U CONVECTOR

Custom quality universal-type units in 23 stock sizes from 13 to 88.5 sq. ft. EDR at low prices achieved through mass production. Approved CS140-47 ratings
Publication 262

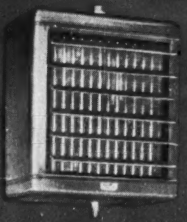
BITT Ventilating Products



NESBITT GAS-FIRED UNIT HEATER

For installations best served by direct-fired space heaters of the suspended propeller fan type. Seven models from 25,000 to 200,000 Btu input. A.G.A. and U.L. approved

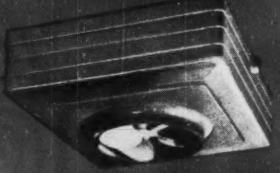
Publication 280



WEBSTER-NESBITT UNIT HEATER

Standard propeller fan heaters for steam or forced hot water; 34,700 to 338,000 Btu/hr., 470 to 4800 CFM
Sold exclusively by Warren Webster & Company

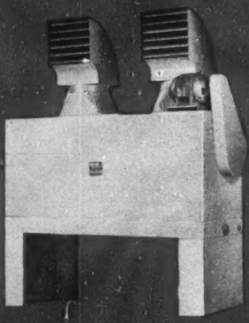
Publication WN126



WEBSTER-NESBITT LITTLE GIANT

Standard propeller fan unit heaters with blower fan performance characteristics
Eight sizes, 28,500 to 510,000 Btu/hr

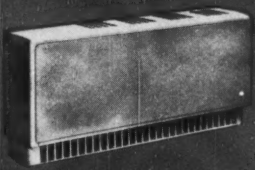
Publication WN134



WEBSTER-NESBITT GIANT

Large capacity units for: heating and/or ventilating, free delivery or static pressure, steam (83,000 to 1,735,000 Btu/hr) or hot water (50,000 to 2,460,000 Btu/hr)

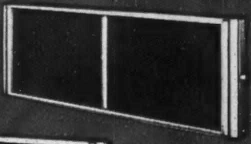
Publication WN135



WEBSTER-NESBITT SERIES R

Standard cabinet unit heaters of classic design for commercial and industrial uses
Steam capacities from 158 to 588 EDR

Publication WN133



NESBITT SERIES D HEATING SURFACE

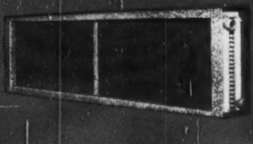
The surface with steam-distributing tubes pioneered by Nesbitt for installations requiring uniform temperature distribution

Publication 247

NESBITT SERIES H HEATING SURFACE

A general purpose heat transfer surface for low- or high-pressure steam applications

Publication 248



NESBITT SERIES W WATER SURFACE

For air cooling, dehumidifying and heating; with cleanable or continuous tubes and Nesbitt exclusive drainability feature

Publication 246

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Heating and Ventilating
Products

Where to Buy NESBITT
HEATING AND VENTILATING PRODUCTS

SALES OFFICE DIRECTORY — LISTED ALPHABETICALLY BY CITIES — FOR THE FOUR GROUPS OF NESBITT PRODUCTS

GROUP No. 1
SCHOOLHOUSE HEATING AND VENTILATING EQUIPMENT

The Nesbitt Syncretizer, Nesbitt Wind-o-line Radiation, The Nesbitt Package, Nesbitt Thermovent, Nesbitt Sill-Line Radiation integrated with Storage Units, and Nesbitt DeLuxe Cabinet Heaters are sold through offices of the American Blower Corporation (ABC) and John J. Nesbitt, Inc. (JJN) as follows:

City and State	*Street Address*	*Telephone*
Albany 7, N. Y. (JJN)	93 State St., Room 43	Albany 6-7661
Albuquerque, N. M. (ABC)	112 W. Granite Ave.	3-5503
Atlanta 3, Ga. (ABC)	101 Marietta St.	Walnut 5617
Baltimore 18, Md. (JJN)	33 E. 21st St.	Belmont 5-5895
Birmingham 3, Ala. (ABC)	1638 Brown Marx Bldg.	7-2383
Boston 15, Mass. (JJN)	236 Huntington Ave.	Copley 7-4202
Buffalo 16, N. Y. (JJN)	1441 Hertel Ave.	Delaware 3739
Charleston, W. Va. (ABC)	1029 Virginia St.	6-1331
Charlotte, N. C. (ABC)	Commercial Bank Bldg. 200 South Tryon St.	3-8444
Chicago 1, Ill. (ABC)	228 N. LaSalle St.	Financial 6-2531
Cincinnati 2, Ohio (ABC)	1005-6 American Bldg.	Parkway 8160
Cleveland 15, Ohio (ABC)	1010 Euclid Ave.	Main 1-6846
Columbus, Ohio (JJN)	101 N. High St.	Adams 7559
Dallas 2, Texas (ABC)	1213 Texas Bank Bldg.	Prospect 1879
Denver 4, Colo. (ABC)	Bus Terminal Bldg.	Main 3179
Des Moines 9, Iowa (ABC)	506 Securities Bldg. 418 Seventh St.	4-1631
Detroit 2, Mich. (ABC)	632 Fisher Bldg.	Trinity 2-4300
El Paso, Texas (ABC)	718 N. Stanton St.	2-2646
Grand Rapids, Mich. (ABC)	510 Assoc. Com. Bldg.	8-1357
Greenville, S. C. (ABC)	105 Palmetto Bldg.	2-4286
Harrisburg, Pa. (JJN)	835 S. 13th St.	Harrisburg 8-8144
Houston 2, Texas (ABC)	1909 Travis St.	Preston 6171
Indianapolis, Ind. (ABC)	619-21 Architects' & Builders' Bldg.	Plaza 4521
Jacksonville 1, Fla. (ABC)	110 Riverside Ave.	6-1366
Johnstown, Penna. (JJN)	206 Fisher Bldg.	Johnstown 9-4108
Kansas City 5, Mo. (ABC)	330 Dwight Bldg. 1004 Baltimore Ave.	Victor 7181
Knoxville 8, Tenn. (ABC)	223 Empire Bldg.	4-1668
Los Angeles, Calif. (ABC)	1105 Architects' Bldg. 816 W. Fifth St.	Michigan 3871
Louisville 2, Ky. (ABC)	1423 Heyburn Bldg.	Jackson 1027
Memphis 3, Tenn. (ABC)	668 South Main St.	8-0339
Mexico City, Mex. (ABC)	San Jan deLetran #37 Apartado 403	
Miami 37, Fla. (ABC)	65 N.W. 49th St.	7-4968
Milwaukee 3, Wisc. (ABC)	231 W. Wisconsin Ave.	Marquette 1-6691
Minneapolis 3, Minn. (ABC)	402 Essex Building 84 South 10th St.	Geneva 7428
New Orleans 12, La. (ABC)	Room 305 Jahncke Bldg. 816 Howard Ave.	Tulane 7105
New York 7, N. Y. (JJN)	11 Park Place	Barclay 7-0260
Omaha 2, Nebraska (ABC)	204 Barker Bldg.	Atlantic 7464
Orange, N. J. (JJN)	285 Main Street	Orange 3-5873
Phila., Pa. (JJN)	State Rd. & Rhawn St.	Devonshire 2-2400
Phila., Pa. (JJN) E. Pa. Sales	1011 Chestnut St.	Market 7-5033
Phoenix, Arizona (ABC)	1600 W. Jefferson St.	Alpine 8-2793
Pittsbugh, Pa. (JJN)	1004 Columbia Bldg.	Atlantic 1-9536
Portland 4, Ore. (ABC)	Pacific Building	Beacon 6197
Richmond, Va. (ABC)	7 North Sixth St.	2-3965
Rock Island, Ill. (ABC)	210 Safety Bldg. 1800 Third Ave.	6-6425
St. Louis 1, Mo. (ABC)	1711 Railway Ex. Bldg. 611 Olive St.	Garfield 1208
Salt Lake City, Utah (ABC)	204 Dooly Bldg.	4-6421
San Francisco, Cal. (ABC)	625 Market St.	Sutter 1-1024
Seattle 9, Wash. (ABC)	1305 Republican St.	Seneca 5860
South Bend, Ind. (ABC)	218 Lafayette Bldg.	3-9305
Springfield, Mass. (JJN)	1537 Main St.	Springfield 2-1878
Syracuse, N. Y. (JJN)	1027 State Tower Bldg.	Syracuse 2-9202
Tampa 1, Fla. (ABC)	509 Twiggs St.	2-2506
Toledo 12, Ohio (ABC)	4359 Kingsbury Ave.	Lawndale 7297
Tulsa 3, Okla. (ABC)	817 S. Boulder St.	3-5223
Washington, D. C. (ABC)	Washington Bldg. 15th & N. Y. Ave., N. W.	National 8-2872

In Canada these products are sold through the Canadian Sirocco Company, Ltd., P.O. Box 360, 310 Ellis Street, Windsor, Ontario.

GROUP No. 2

Complete sales and service for Nesbitt Baseboard Radiation, Model U Convectors, Gas-Fired Unit Heaters, Nesbitt Heating and Cooling Surface, and Nesbitt Wall-Hung Sill-Line Radiation are provided by the following offices listed in your telephone directory under John J. Nesbitt, Inc.:

Albany 7, N. Y.	93 State St., Room 43	Albany 6-7661
Atlanta 3, Ga.	305 Techwood Drive NW	Lamar 565
Baltimore 18, Md.	33 E. 21st Street	Belmont 5895
Boston 15, Mass.	236 Huntington Avenue	Copley 7-4202
Cleveland 15, Ohio	958 Hanna Bldg.	Prospect 1-2320
Columbus, Ohio	101 N. High Street	Adams 7559
Detroit 11, Mich.	2832 E. Grand Boulevard	Trinity 1-3880
Johnstown, Penna.	206 Fisher Building	Johnstown 9-4108
New York 7, N. Y.	11 Park Place	Barclay 7-0260
Orange, N. J.	285 Main Street	Orange 3-5873
Philadelphia, Pa.	State Rd. & Rhawn St.	Devonshire 2-2400
Pittsburgh, Pa.	501 Columbia Building	Atlantic 1-9536
Springfield, Mass.	1537 Main Street	Springfield 2-1878
Syracuse, N. Y.	1027 State Tower Bldg.	Syracuse 2-9202
Toledo 13, Ohio	2157 Mansfield Road	Lawndale 3226

GROUP No. 3

Additional offices handling Nesbitt Heating and Cooling Surfaces:

Buffalo, N. Y.	1441 Hertel Avenue	Delaware 3739
Cleveland 3, Ohio	4500 Euclid Ave.	Utah 1-5244
Davenport, Iowa	320 Western Avenue	7-6123
Des Moines 9, Iowa	1112 Locust Street	8-5721
Duluth 2, Minn.	503 Builders Ex. Bldg.	7-1767
Greenville, S. C.	104 E. Stone Avenue	3-7488
Indianapolis, Ind.	5425 College Avenue	Broadway 9233
Melrose, Mass.	507 Main Street	Melrose 2404
Nashville 1, Tenn.	103 Sixteenth Ave. S.	45-5006
New Orleans, La.	3144 Paris Ave.	Bywater 2751
Oklahoma City, Okla.	1604 N.W. Fifth Street	3-6351
Orlando, Fla.	1623 E. Washington St.	2-2252
St. Louis 8, Mo.	3923 W. Pine Boulevard	Franklin 1137
Salt Lake City 4, Utah	44 W. Eighth South	
Spokane 1, Wash.	602 Empire State Bldg.	Main 2244
Tulsa, Okla.	P.O. Box 1137	Tulsa 3-1101

GROUP No. 4

Webster-Nesbitt Giant Unit Heaters, Webster-Nesbitt Little Giants, Webster-Nesbitt Standard Propeller Fan Unit Heaters, and Webster-Nesbitt Series R Cabinet Unit Heaters are sold exclusively by Warren Webster & Company, Camden 5, New Jersey, with branch offices in principal cities. Look for *Warren Webster & Company* in the local telephone directory.

JOHN J. NESBITT, INC.

Main Office and Factory: HOLMESBURG, PHILADELPHIA 36, PA. — Telephone DEvonshire 2-2400

"I didn't know it was Integral"

"I didn't expect the fins to be part of the tube."

"Well, if you had to list the advantages of Wolverine Trufin*—you'd find that the integral feature would top the list.

"Because Trufin is integral, the fins are actually part of the tube. They're extruded—literally squeezed—right out of the wall of the tube. That means they'll stand up under vibration and the shock of sudden temperature changes—that there's maximum heat transfer and that Trufin can be bent, coiled and otherwise fabricated just like plain tube."

"Is that all? Are there other advantages?"

"Definitely! Trufin lets you design a much more compact heat exchanger . . . one that will provide more BTU's per foot of tubing. That means it does a better job at a lower cost. Too, Trufin is available not only in copper and copper-base alloys, but in aluminum, bi-metal, electric-welded steel and other metals."

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Wolverine Trufin* and the Wolverine Spun End Process† available in Canada through the Unifin Tube Co., London, Ontario

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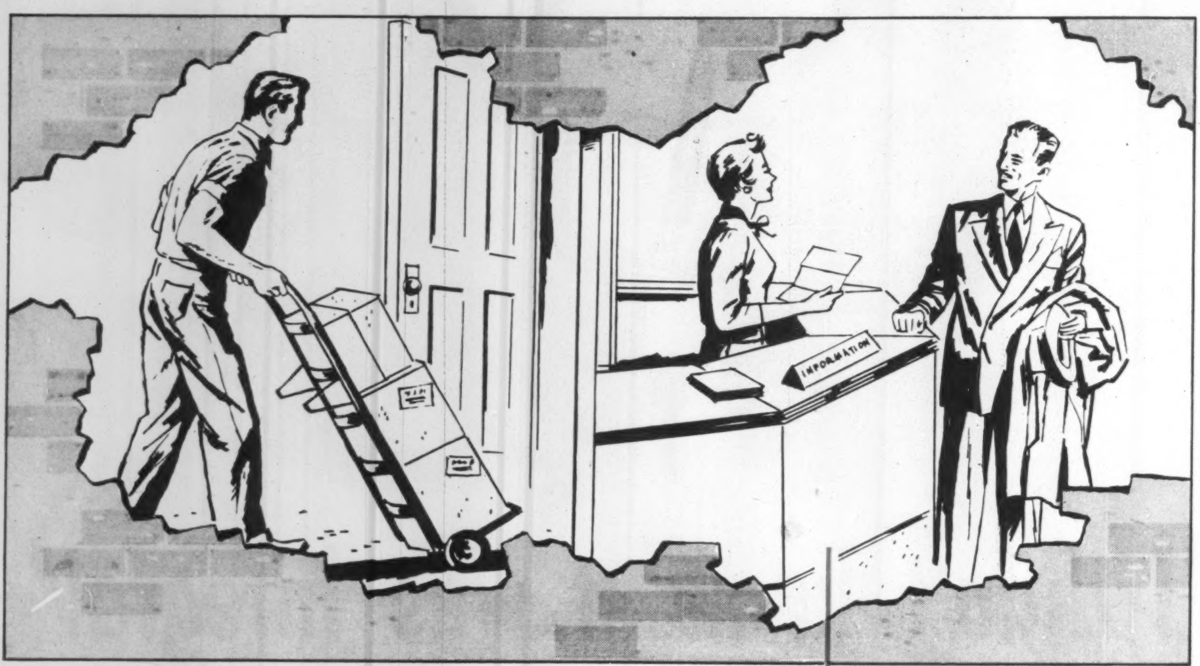

the construction and maintenance of *comfortable customers*

Satisfied customers are built on a basis of Air Conditioning installations that stand up to any service—continually deliver comfort day-after-day, year-in and-out—without need for repeated requests for "service".

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Ingersoll-Rand motorpumps on air-conditioning service give you extra advantages for better, easier installation

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  Put in these rugged pumps and forget them. Their ability to stand up to severe operating conditions is assured.

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  Bolt them to whatever's handy — walls, floors, other equipment—no baseplates or couplings required. They operate at top efficiency in any position.

- Maximum Efficiency:

  Exclusive design features give you pumps that win size-for-size comparisons with any other pumps in air conditioning service.

- Space Saving:

  The compactness of I-R pumps ends "fitting-in" headaches in any size installation.

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for **AIR CONDITIONING** service

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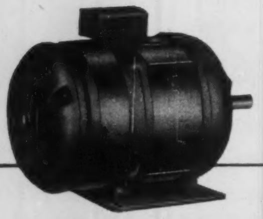
BALTRIC—Single Phase Motors, Capacitor Start, Induction Run, Horizontal Enclosed Construction, Solid Mounted, Ball Bearing, 115/230 V., 60 Cyc., Continuous Duty, 55° C. Rise, Reversible

H. P.	F. L. R. P. M.	N. E. M. A. No.	Breakdown Tq. % F. L.	F. L. % Eff.	F. L. % P. F.	Net Weight
⅓	1725	56	250	67	68	34
½	1725	56	250	70	68	39
¾	1725	56	225	73	74	42

BALTRIC—Three Phase, Squirrel Cage, Induction Motor, Horizontal Enclosed Construction, Ball Bearing, Normal Torque Design B, 220/440 V., 60 Cyc., Continuous Duty, 55° C. Rise

H. P.	F. L. R. P. M.	N. E. M. A. No.	Breakdown Tq. % F. L.	F. L. % Eff.	F. L. % P. F.	Net Weight
½	1725	56	340	74	74	28
¾	1725	56	320	76	76	32
1	1725	182	300	80	82	55
1½	1725	184	300	86	87	59
2	1725	184	300	88	89	62
3	1725	213	260	88	89	97
5	1725	215	240	89	89	109



BALDOR STREAMCOOLED® MOTORS
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are still available:
SINGLE PHASE: ¼ to 7½ h. p.
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BETTER MOTORS

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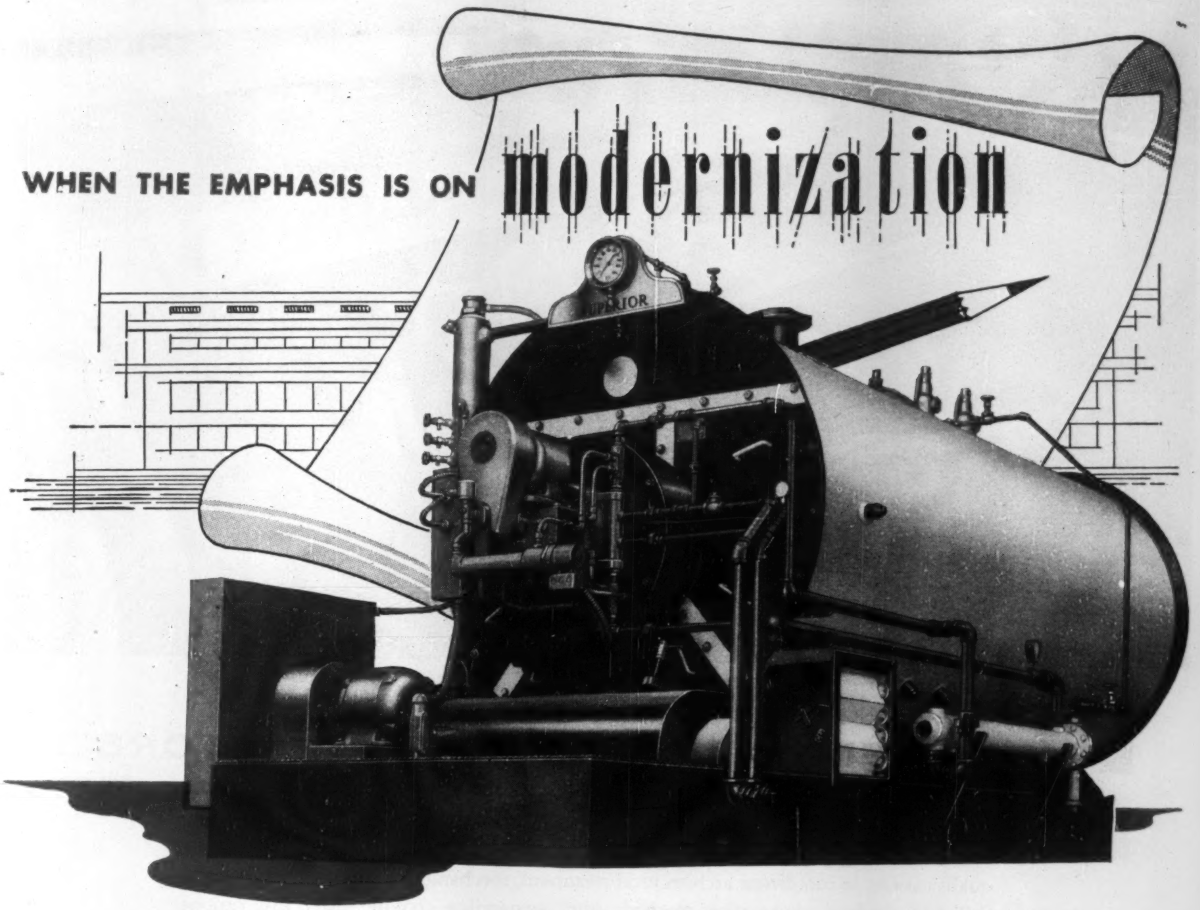

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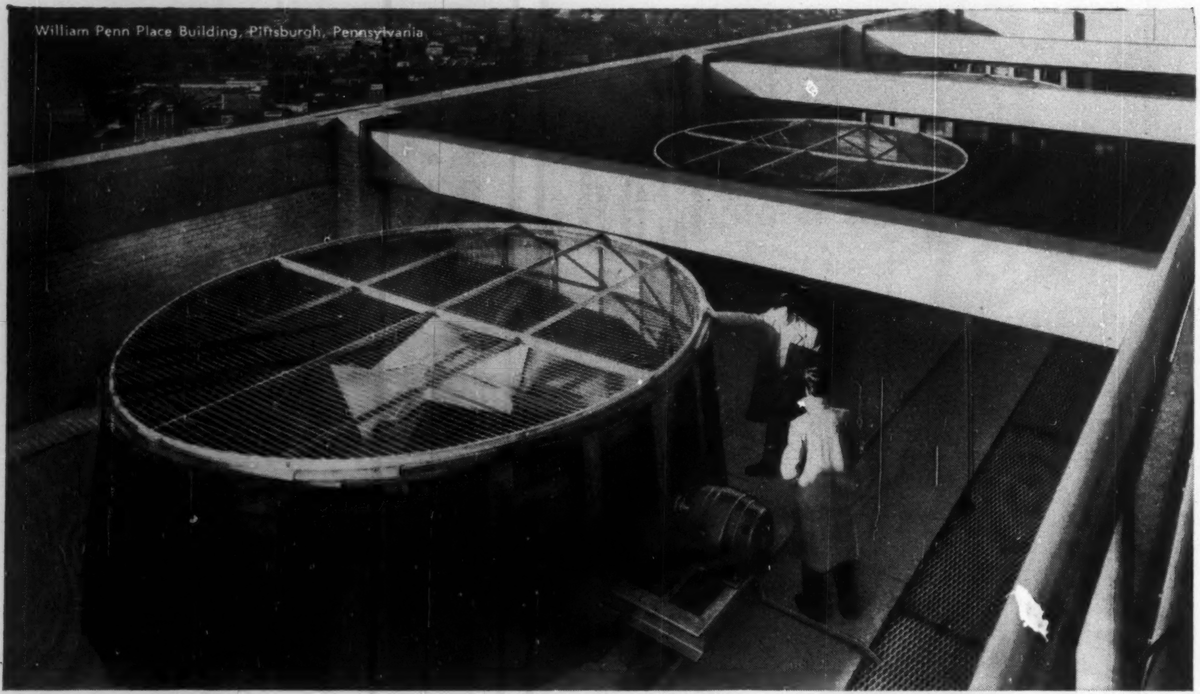
STEAM GENERATORS

SUPERIOR COMBUSTION INDUSTRIES INC.
TIMES TOWER, TIMES SQUARE, NEW YORK 36, N.Y.



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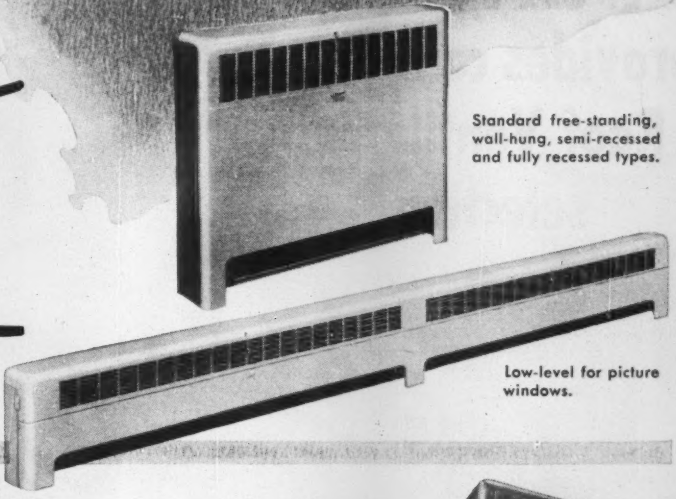
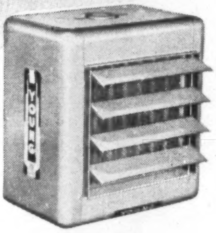
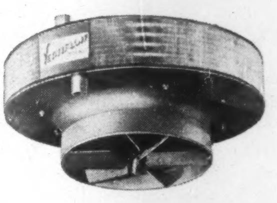


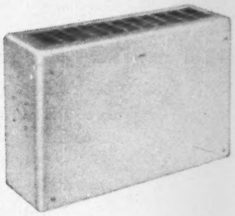
Standard free-standing, wall-hung, semi-recessed and fully recessed types.

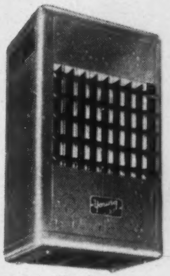
Low-level for picture windows.

UNIT HEATERS





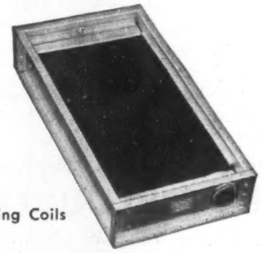




For Use With Steam or Hot Water

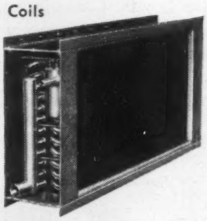
Gas-Fired

COILS

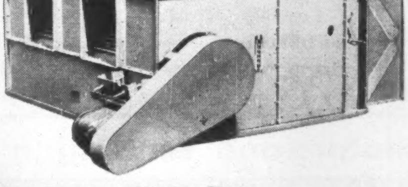


Heating Coils

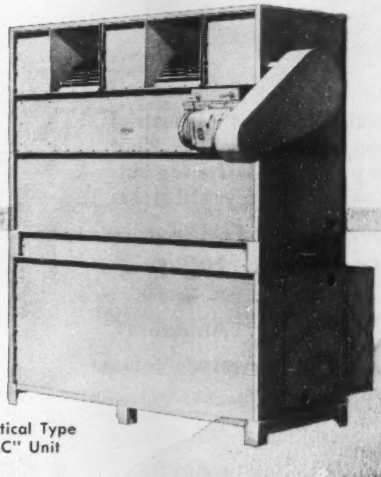
Cooling Coils



AIR CONDITIONING UNITS



Horizontal Type
"YAC" Unit



Vertical Type
"YAC" Unit

YOUNG

YOUNG RADIATOR COMPANY
DEPT. 514-A, RACINE, WISCONSIN

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Heating, Cooling, and Air Conditioning Products for Home and Industry.

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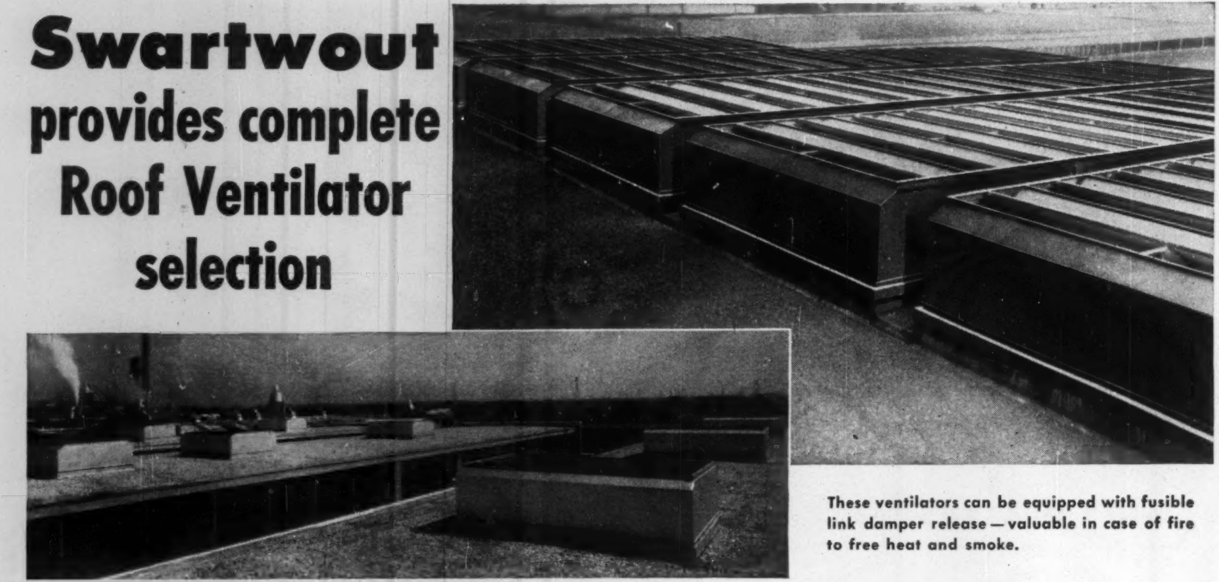
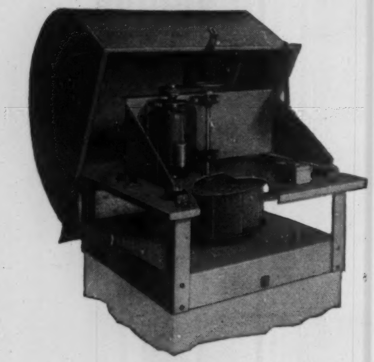
Swartwout provides complete Roof Ventilator selection



These ventilators can be equipped with fusible link damper release — valuable in case of fire to free heat and smoke.

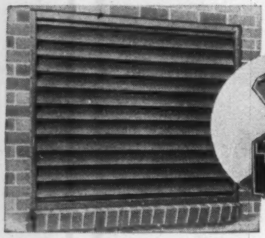
For Gravity Service—the AIRMOVER, for example



Make use of Airmover's many advantages for a large variety of buildings. It's the most widely used equipment for large scale ventilation. Has great exhaust capacity without power cost—is lowest cost ventilator per square foot of roof opening. Low, spreading contour eases roof load; avoids stays and guy wires. Only 32″ high from curb to highest part . . . Other Swartwout Gravity Ventilators: the Dexter Heat Valve, Gravity Valvent, and Rotary—the original rotating ventilator.

For Power Service—the AIRLIFT, for example

Airlift provides efficient high capacity duct exhaust at very low noise levels. Completely balanced centrifugal fan runs at low tip speed. Ventilator design features streamlined fan inlet, oversize outlet opening. Wide range of sizes and capacities, including Airlift Junior for CFM under 1000 . . . Other Swartwout Powered Ventilators: Airjector, Powered Valvent, Ject-O-Valve, Whirlout.



For Fresh Air Intake—the AIRLOUVER

Custom-made for each job *without premium cost,* the weatherproof Airlouver provides unusual adaptability —enables you to fill any opening with equal-size louver units. Made in adjustable or fixed styles . . . Where *standard* sizes are suitable, we offer Swartwout Industrial Louvers.

See our catalog in Sweet's Industrial Construction, Architectural, or Plant Engineering Files, or write for bulletins on any of these ventilators:

For Gravity Service

●

Airmover
Heat Valve
Rotary
Gravity Valvent

●

Louvers
Airlouver
Industrial

For Power Service

●

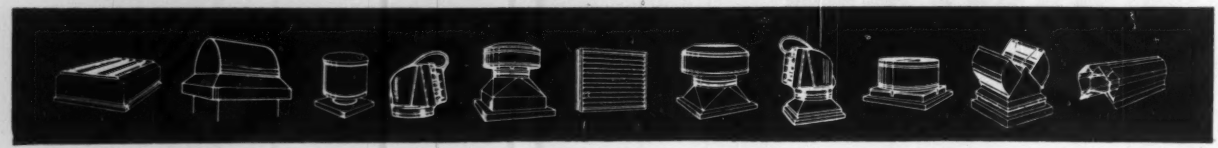
Airjector
Powered Valvent
Ject-O-Valve
Whirlout
Airlift
Airlift Jr.

18568 Euclid Avenue, Cleveland 12, Ohio

The Swartwout Co.

Roof Ventilators and Ventilating Louvers

POWER PLANT EQUIPMENT • PROCESS INDUSTRY CONTROLS



12 YEARS ON THE JOB
...WITH NO SERVICE NEEDED!
B&G BOOSTER SHOWS NO EVIDENCE
OF WEAR IN ANY PART

The illustration above is an actual photograph of a B & G Booster after 12 years of operation. During this period, the pump did not require service of any kind. When disassembled and critically examined, no measurable signs of wear could be detected in the shaft, seal and bearings.

This is pretty substantial evidence that in every detail of design, materials and workmanship, B & G Boosters are built for long life and dependability. It explains why more B & G Boosters are sold than all other similar pumps combined.

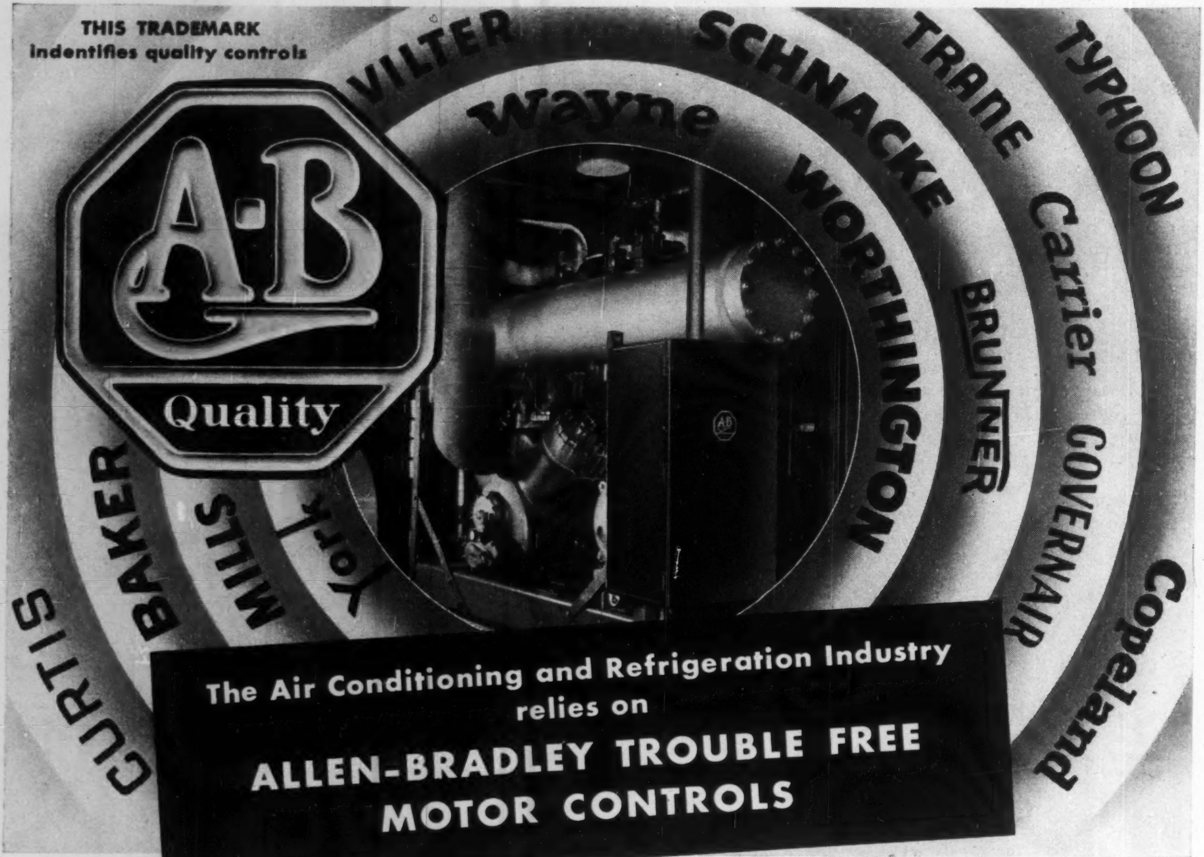
Send for B & G Catalog giving size and capacity data on B & G Boosters and Universal Pumps.

And here's today's Booster—engineered to new space-saving compactness, yet just as powerful

There is no point in employing a 1/6 H.P. motor to do a job actually requiring only 1/12 H.P. That's why B & G Boosters up to 1¼″ are now built with a smaller motor—but have exactly the same capacity as previously.

This motor is the first to be specifically designed to match the reduced size of modern boilers and equipment. Heretofore, pumps were designed to conform to the characteristics of available motors. Now B & G builds a motor in its own plant which permits integrated design between pump and motor.

BELL & GOSSETT
COMPANY
Dept. DG-5, Morton Grove, Ill.
Canadian Licensee: S. A. Armstrong, Ltd., 1400 O'Connor Drive, Toronto, Canada


THIS TRADEMARK
indentifies quality controls
A-B
Quality
VILTER
SCHNACKE
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TYPHOON
Wayne
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The Air Conditioning and Refrigeration Industry relies on

ALLEN-BRADLEY TROUBLE FREE MOTOR CONTROLS

These manufacturers can give you the reason for the popularity of Allen-Bradley starters and controls in the air conditioning and refrigeration business. Basically, this reputation is established on only one moving part in Allen-Bradley starters. There are no pivots, pins, bearings, and similar "clap trap" to corrode, collect "gunk," and stick. You install Allen-Bradley starters . . . and take a look once or twice a year.

There is no contact maintenance . . . Allen-Bradley cadmium silver alloy contacts never need cleaning, filing, or dressing.

Dependable overload relays . . . Allen-Bradley thermal relays are dependable and remain accurate in their operation over the years!

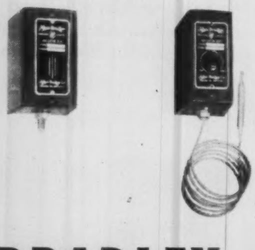
Install Allen-Bradley motor controls in your equipment, today, for rugged, reliable performance.

Allen-Bradley Co., 1335 S. First St., Milwaukee 4, Wis.

TYPICAL ALLEN-BRADLEY REFRIGERATION CONTROLS

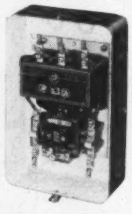
SPECIAL REFRIGERATION CONTROL UNIT

PRESSURE AND TEMPERATURE CONTROLS

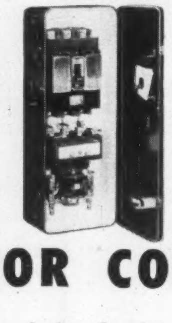


MANUAL STARTER

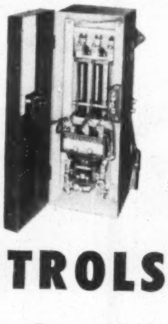
AUTOMATIC STARTER



COMBINATION STARTER



MANUAL REDUCED VOLTAGE STARTER

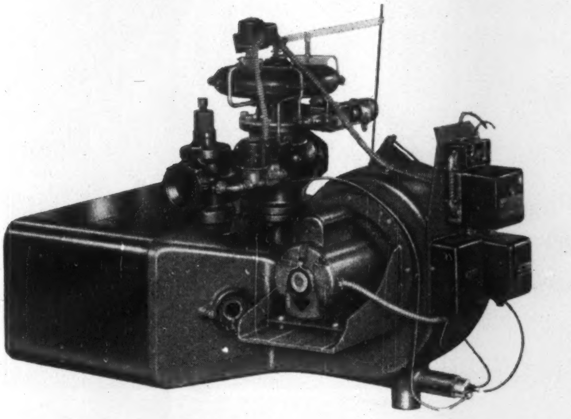


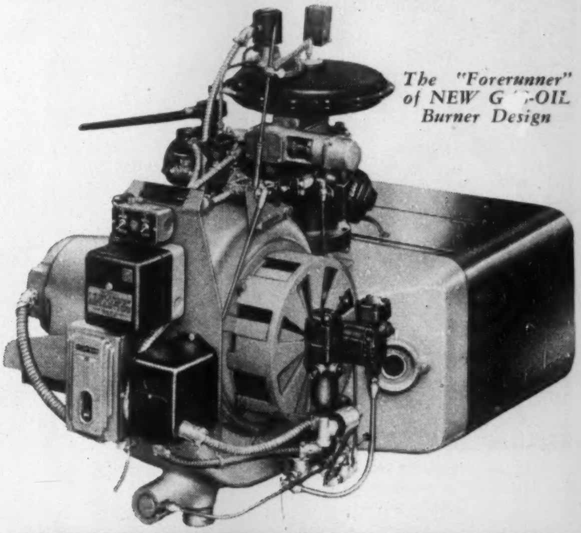
ALLEN-BRADLEY QUALITY MOTOR CONTROLS

Mettler "FAN-AIR" AUTOMATIC MECHANICAL DRAFT "PACKAGED" GAS BURNERS

and Companion DUAL FUEL BURNERS

The Pre-Eminence of "FAN-AIR" Gas Burners and the MGO Series Combination Gas and Oil Burners has been proven by satisfied users all over the country.



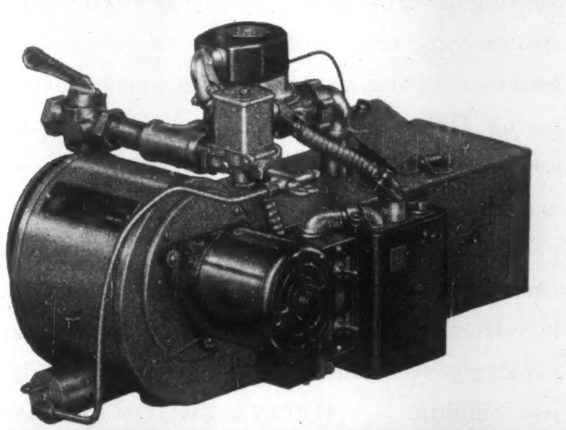

The "Forerunner" of NEW G[illegible]-OIL Burner Design

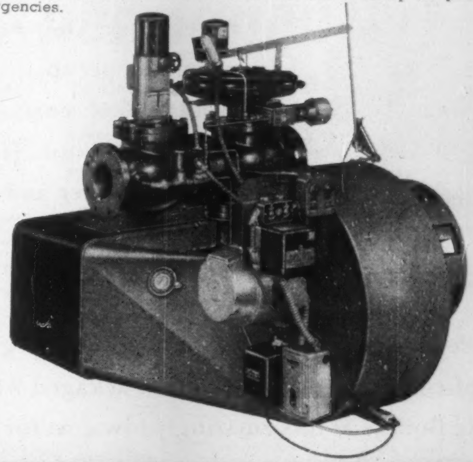
Model 32F-3 • Gas Burner • 300 H.P.

New 1953 Model features automatic safety pilot and triple controls. Not just a burner, but a COMPLETE and FULLY AUTOMATIC GAS BURNER SYSTEM, factory tested and ready for application when received. Furnished complete as pictured with simple dependable automatic "On and Off" or modulating controls. Burner and controls WITH SPARK IGNITION ~~and~~ FLAME SAFEGUARDS are scientifically coordinated to provide INSTANT FUEL SHUT-OFF on FLAME FAILURE — MEETING APPROVAL REQUIREMENTS. 12 sizes, 5 to 500 H.P.

Model MGO-504 • Gas or Oil • 250 H.P.

A fully automatic mechanical draft burner employing the ENTRAINED COMBUSTION PRINCIPLE operates equally efficiently with any gas or No. 2 or No. 5 Fuel Oil. A **"flip of the switch"** or automatic remote control changes from Gas to Oil or in reverse. Nothing else like it on the market. Another example of Mettler Leadership designed to fill the trend and need of the Gas Industry for peak-load emergencies.





Model 4F-R • Compact Low-Price Gas Burner

Another new current development designed for those small difficult jobs where price is a factor. The smallest model in the Mettler Series, this burner has all the outstanding "Fan-Air" features. The efficiently designed single burner unit has a full capacity range from 100,000 to 750,000 BTU hourly input. **No other burner so easy to install.**

Model 42G-3 • Gas or Oil • 500 H.P.

Meet the latest, not a combination of "Old Stuff," but an entirely new product. A Gas or Oil Burner designed to use light and heavy oils with steam, air or pressure atomizers. Note the simplicity, compactness, and modern assembly symbolic of Mettler engineering, representing the first major advance in "packaged" Dual Fuel Burners.

ALL BUILT ON THE *"Entrained Combustion"* PRINCIPLE • THE "FAN-AIR" MGO SERIES IS WORTHY OF YOUR SPONSORSHIP • PROMPT SHIPMENTS ASSURED • WRITE FOR DETAILS.

EXPERTO CREDE

4366
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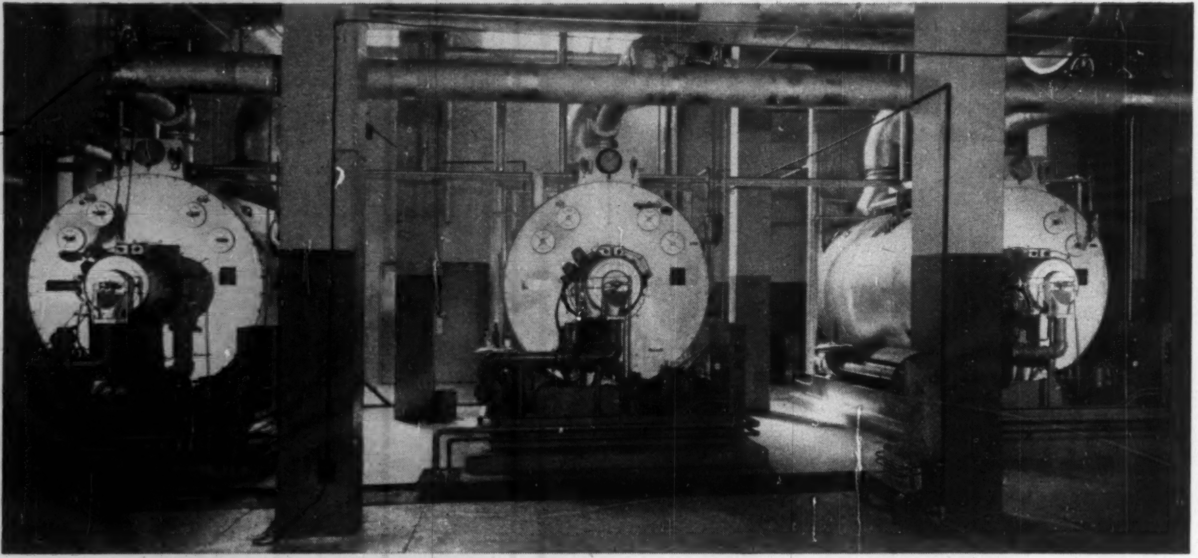
THE METTLER CO. INC.

LOS ANGELES 63
CALIFORNIA

[illegible]

IN ALL TYPES OF BUILDINGS



This installation was made by Continenta Engineers, Inc., mechanical contractors, of Atlanta. Gas is supplied by Atlanta Gas Light Company.

Powermaster® Efficiency Pays Off

For example: Only $1.15 per month per apartment average fuel costs the year around for Heating, Hot Water and Air Conditioning for 535 apartments in Howell House at Atlanta, Ga.

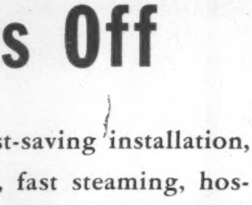
These services in this new modern building are supplied by three *Powermaster* Packaged Automatic Boilers at this amazingly low cost for gas and oil fuel. Providing year-round services with the boilers result in maximum operating economy. Yet fuel saving is only one reason *Powermaster* is so popular with those who select, install and operate boilers for all types of buildings—offices, hotels, institutions, churches, housing projects, etc. Cost-saving installation, space-saving compactness, fast steaming, hospital-clean operation, dependability, maintenance-saving accessibility, fully automatic operating and safety controls, and smokeless combustion are others. Compare *Powermaster* with any other packaged automatic boiler and you'll see why it is today's best buy for schools, industrial plants, laundries, and other requirements as well as for all types of buildings. Send for latest descriptive bulletin.

O&S

Powermaster®

PACKAGED AUTOMATIC BOILERS

In sizes to 500 HP; pressures to 250 psi.



ORR & SEMBOWER, INC. • Established 1885 • **Morgantown Road, Reading, Penna.**

from the Simplest Single Pipe System...

to the most Complex Multiple Pipe Installation...

Pouring Z-Crete Insulation into forms for single pipe system to provide an insulated conduit that is strong, resilient, compact and efficient.

Conduit containing 10 pipes in typical installation. Pipes anchored to base, support blocks in place prior to pouring of Z-Crete. Low cost construction.

"Z"crete®

THE MODERN MONOLITHIC INSULATION

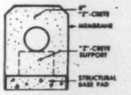
Insulates underground heated piping *easier, economically, permanently!*

No pipe arrangement too tough for this versatile insulation! Z-CRETE affords permanent insulating efficiency—forms a safe, solid monolithic protection around one pipe or a *dozen* in the same conduit . . . without joints or voids. Hundreds of thousands of feet of Z-CRETE have been installed in all parts of the country and in all types of soil conditions. Any number, size or arrangement of pipes can be designed into a Z-CRETE conduit. Made of inorganic, rotproof, insulating concrete—monolithic pour assures restricted water movement around the assembly. And you'll find it's usually the most economical system to install. Write for complete details today!

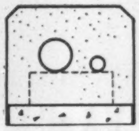
No Other Insulation for Underground Piping Offers All These Superior Advantages!

- **More Adaptable**—Z-Crete is entirely a field fabrication. No pre-formed sections are required.
- **More Economical**—Low in cost, provides permanent and stable insulation. Especially economical in large pipe or multiple pipe conduits.
- **More Efficient**—Six inches of insulation around piping provides plus insulation value—eliminates heat loss due to air movements.
- **Permanent**—Will not rot or deteriorate, water-resistant. It's resilient, completely fireproof.
- **Readily Available**—No critical materials required. Experienced, licensed applicators, located in all parts of the country, are ready to serve you.

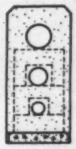
FOR ANY HEATED UNDERGROUND SYSTEM



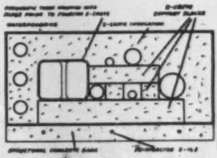
SINGLE PIPE CONDUIT



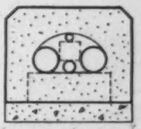
TWO PIPE CONDUIT



PIPE OVER PIPE



MULTIPLE PIPE CONDUIT



MULTIPLE PIPE CONDUIT WITH STEAM TRACER

"Z"crete®

DIVISION

ZONOLITE COMPANY
135 So. LaSalle Street • Chicago 3, Illinois

Z-Crete is furnished and installed only by licensed applicators of Zonolite Company under U. S. Patent No 2355966—Canadian Patent No. 439356

WRITE FOR FREE BOOKLET!

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Please send FREE Z-Crete Booklet with full details and specifications about this easier, better insulation of underground heated piping.

Name..............................

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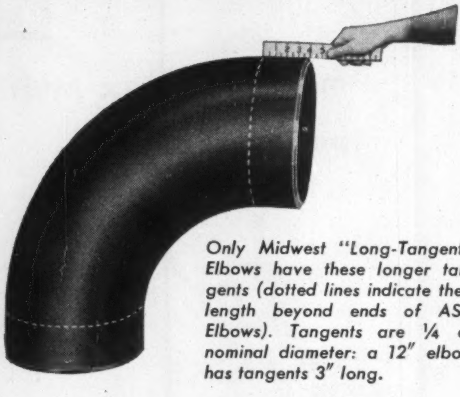
Money-Savers



Only Midwest "Long-Tangent" Elbows have these longer tangents (dotted lines indicate their length beyond ends of ASA Elbows). Tangents are ¼ of nominal diameter: a 12" elbow has tangents 3" long.

This young man's dad also saves money. But he does it by specifying Midwest LONG-TANGENT Elbows whenever he needs welded piping. These elbows (see above) can be lined up with pipe more quickly and accurately. Less pipe is required and a short nipple (with its extra circumferential weld) is frequently eliminated. Slip-on welding flanges are easily used with minimum change in either flange or fitting. And then . . . Midwest "Long-Tangent" Elbows cost no more than ASA Elbows. You, too, can save money by specifying them on your next welding fittings order.

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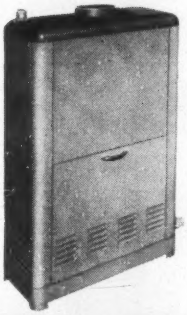
MIDWEST WELDING FITTINGS

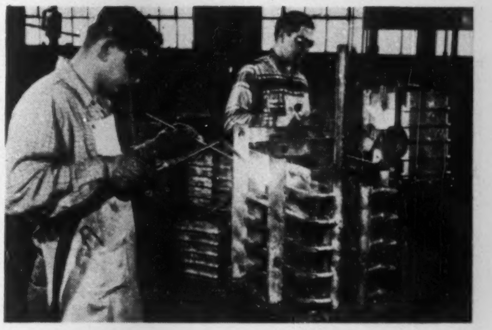
IMPROVE PIPING DESIGN AND REDUCE COSTS

WHEN YOU *MUST* HAVE Strong Leak-tight Ductile JOINTS

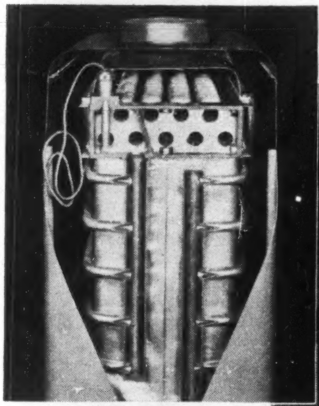
...braze with EASY-FLO



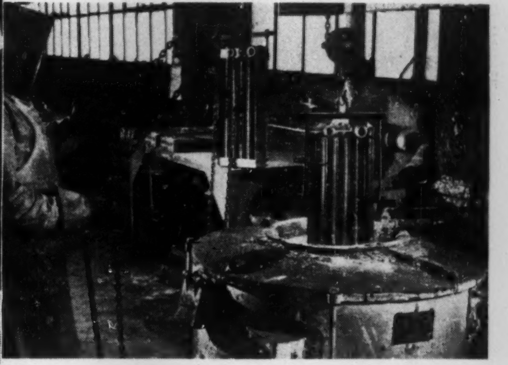
• This low-temperature silver brazing alloy just naturally and consistently makes joints that have all three of these properties—and does it fast and at surprisingly low-cost. That's why you'll find so many manufacturers in the heating, air conditioning and refrigerating industries brazing with EASY-FLO. The well-known RUUD water heater is a typical example. Here's the *inside* story.



Copper tubes are first brazed to large copper tube manifolds (above) — and then jigged and brazed to copper jacket. 3/32" EASY-FLO 35 wire does these jobs using torch heating — time, jigging included, 10 minutes. The same basic construction is used in RUUD house heating boilers.



Copper finned tubes and bronze headers are assembled in jigs with 1/16" EASY-FLO 45 wire rings at each joint — then brazed by dipping in hot salt bath as you see below.



AT YOUR CALL

Expert aid in applying EASY-FLO brazing to your metal joining. No obligation. Ask for a Field Engineer.

GET THE WHOLE EASY-FLO BRAZING STORY

BULLETIN 20 tells you in detail what EASY-FLO is, what it does, and how to put it to work—plus valuable information on joint design and fast brazing production methods. Write for a copy today.

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ORIGINATORS OF EASY-FLO & SIL-FOS

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SUPERB PERFORMANCE

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TICOSTEAM

PACKAGE STEAM GENERATOR

For light oil, and light oil and gas

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Heavy oil, and heavy oil and gas

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Natural or manufactured gas

For factories, stores, hospitals, apartments, office buildings—wherever high-efficiency heating and power are a special consideration—specify and install TICOSTEAM for dependable satisfaction! A complete steam plant, equipped with every safety feature, this outstanding unit is *Titusville* in top quality and performance on the job. Request our descriptive Bulletin B-3100.

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IRON WORKS CO
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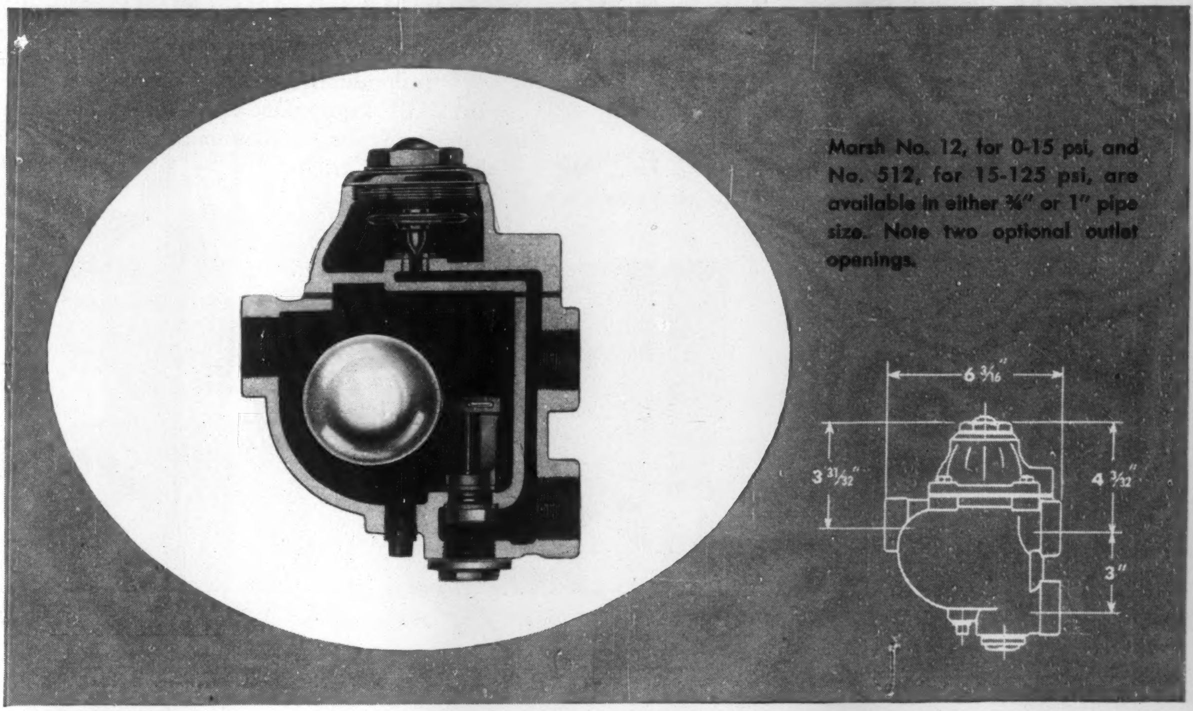
THE TITUSVILLE IRON WORKS COMPANY

TITUSVILLE, PENNSYLVANIA

Manufacturers of A COMPLETE LINE OF BOILERS FOR EVERY HEATING AND POWER REQUIREMENT

MARSH No. 12

Float and Thermostatic Trap



Marsh No. 12, for 0-15 psi, and No. 512, for 15-125 psi, are available in either ¾" or 1" pipe size. Note two optional outlet openings.

... The most dependable trap you can use

There are many jobs that only a float *and* thermostatic trap can handle properly . . . and in the Marsh No. 12 you have the most respected F & T trap ever developed.

Here is a trap that counts its users in thousands. Repeat orders are the rule because men who know have discovered that no other trap can quite duplicate its absolutely dependable, trouble-free performance in removing all air and condensate from steam mains, branches, risers, unit heaters, coils, and similar applications.

Two precision-built assemblies accomplish this. All condensation is discharged by the float-operated valve located at the low point in the trap body. All air is vented through the by-pass by the action of the thermostatic diaphragm, but this is one of those Marsh diaphragms that closes the valve immediately in the presence of steam. In fact the accuracy of response is the attribute that distinguishes the Marsh thermostatic element. It gets the air out and keeps the steam *in!* Another big feature is the straight through design which eliminates troublesome excess piping.

No. 12 is your F & T trap for those low pressure applications — up to 15 psi W.S.P. but its identical-in-operation companion, No. 512, covers the working pressure range of 15 to 125 psi. There is a Marsh trap for every low or medium pressure application.

Write for catalog 76-H covering Marsh heating specialties

MARSH HEATING EQUIPMENT CO., *Sales Affiliate of Jas. P. Marsh Corporation*
Dept. T, Skokie, Illinois
Manufacturers of gauges, thermostatic regulating valves, Solenoid valves, heating specialties

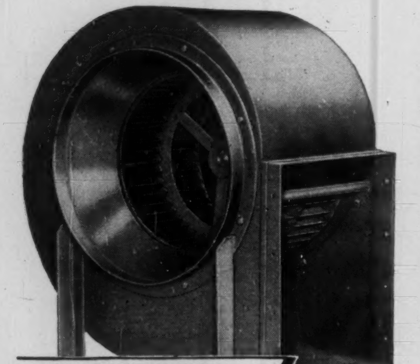
MARSH *Heating Specialties*
SINCE 1865

Bayley

Engineered

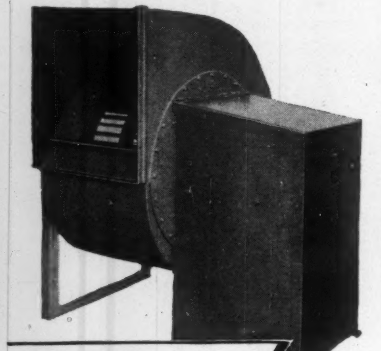
AIR HANDLING EQUIPMENT

Individually, or in combination, the BAYLEY equipment units shown here afford you an efficient, economical solution for your air handling problems. Each item is designed and engineered by Bayley specialists for maximum service and efficiency.



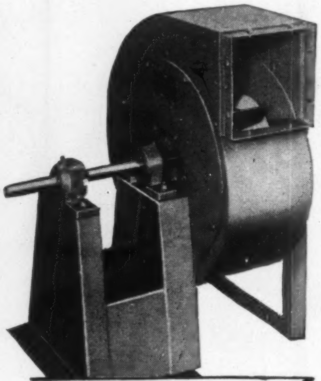
VENTILATING FANS

Equipped with forward or backward curved wheels — for Ventilating, Conditioning, Mechanical Draft.



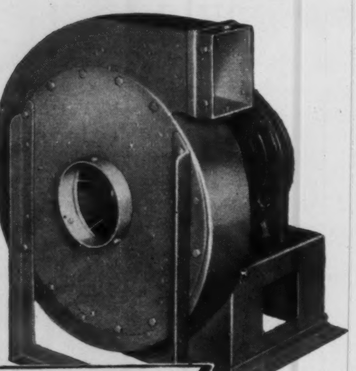
VENT SETS

Belt or Direct-Driven, designed for applications requiring moderate air volumes.



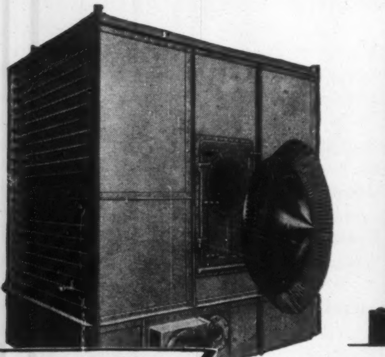
INDUSTRIAL EXHAUSTERS

Fume exhaust, materials handling, high temperatures effectively handled with this radial-blade fan.



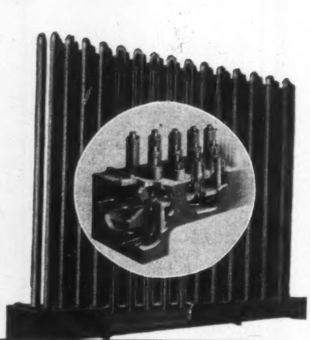
PRESSURE BLOWERS

For draft and conveying with moderate air volumes at relatively high pressures.



SPRAY APPARATUS

Turbo, Pressure Nozzle and Cellular Air Washers for comfort or process conditioning applications.



HEATERS

Blast Coils — Aerofin & Chinook; Heating and Cooling: Steam, Water, Direct Expansion.

Ask for illustrated literature covering BAYLEY Equipment of interest to you.

Bayley

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FLAME FAILURE EXPLOSIONS

A non-technical explanation of causes and safeguards by

COMBUSTION CONTROL CORPORATION

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Records show the chances are 4-to-1 you are NOT protected against explosion hazard, if you burn fuel for heat, power, or processing.

WHEN A BURNER flame fails without instant cut-off of fuel, an explosive mixture collects . . . and may ignite disastrously on hot firebricks. A delay of only 30 seconds can spell tragedy, yet most "safeguards" in use today simply do not act that fast!

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You can do a great deal, easily, inexpensively. First, send for this free booklet. "Guarding Your Properties Against Flame-Failure Explosions" is a primer on such hazards, quickly and easily read. With it you can check the protection you now have, and determine the protection you really need. Money-wise it could prove to be the most important booklet you've ever read.

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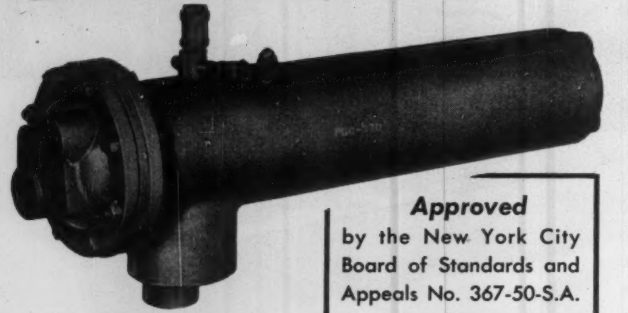
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PUMPS

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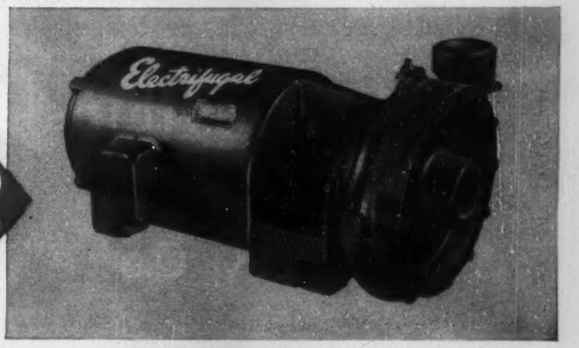
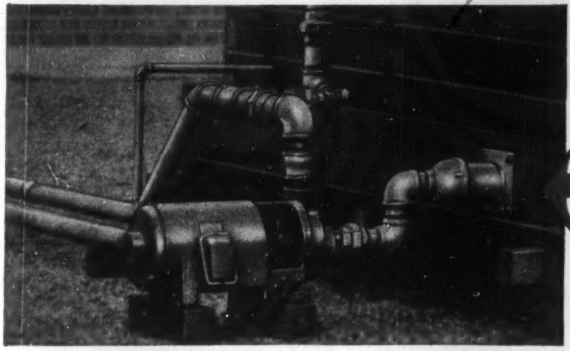
SAVE—NO EXTRA PARTS TO BUY

2

Designed as a complete, compact unit, Allis-Chalmers close-coupled pumps don't require extras — such as couplings, bases or shims. The pumps come as units ready to hook up and run!





3

SAVE ON INSTALLATION TIME

Bolt it down, hook up the line and piping, and your Allis-Chalmers pump is ready to go. There's no alignment problem. Correct installation is a big factor in pump performance and the A-C engineer will advise you at this point.

For more information about Allis-Chalmers air conditioning pumps, write for bulletins 52B6140, 52B7529, 52B6083 or 52B6975.

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FHP PACKAGE PUMP

Standard with mechanical seal. Widely used and accepted for air conditioning and refrigeration.

Bulletin 52B7529

Electrifugal

***ELECTRIFUGAL* PUMP**

A close-coupled pump with either conventional packing or mechanical seal.

Bulletin 52B6140

SUPPORTING ADAPTER PUMP

Flange motor and pump on sturdy supporting adapter. With conventional packing or mechanical seal.

Bulletin 52B6083

VERTICAL MOUNTED PUMP

Mechanical seal or sealless units with choice of submerged or sidewall mounting.

Bulletin 52B6975

Electrifugal is an Allis-Chalmers trademark.

ALLIS-CHALMERS

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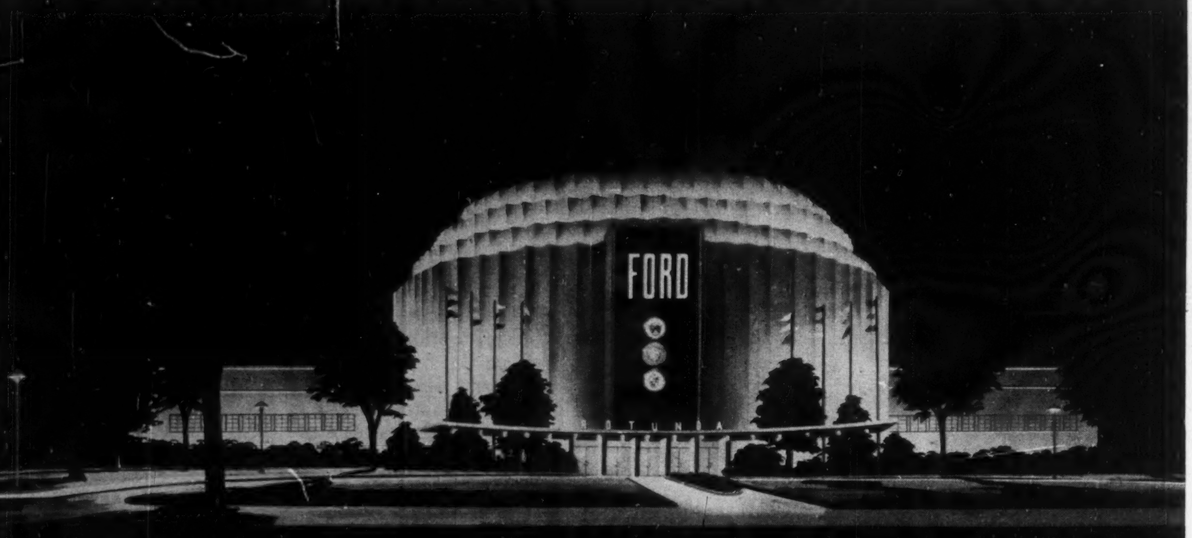
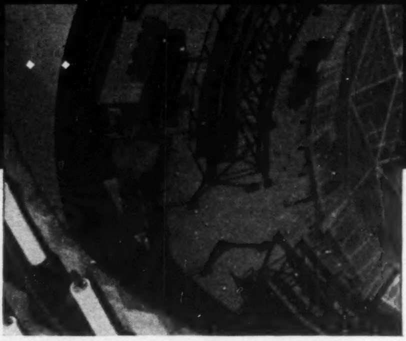


Marlo Helps to Cool Ford's Giant "Birthday Cake"........



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Air Conditioning & Refrigeration Contractors:
Detroit Ice Machine Co.
Industrial Piping:
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The newly-reopened Ford Rotunda at Dearborn, Mich., towers into the sky like a giant's birthday cake from some fantastic fairy tale, its top ablaze with 50 candles to mark the Golden Jubilee of the Ford Motor Company.

Thanks to the magic of modern air conditioning, the thousands of daily visitors who view the many interesting exhibits in this massive windowless structure enjoy complete comfort—a comfort that Marlo is proud to have a part in providing.

Two huge Marlo 100-ton cooling towers, concealed on the roof behind the fluted columns, play an important role in the air conditioning system which keeps this fabulous "birthday cake" cool and comfortable even in the hottest of summers.

Marlo Cooling Towers are designed to save up to 95% of normal water demand . . . to operate quietly and unobtrusively . . . to give long service with minimum maintenance. Available for indoor or outdoor location, they range in capacity from 20 tons to 100 tons or more. For residential and light commercial use, Marlo produces the new 2-16-ton "Thrifti-Tower."

WRITE to Marlo today for complete information on efficient, economical cooling towers for every application.

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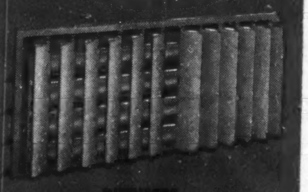

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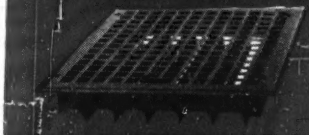
Double or Single



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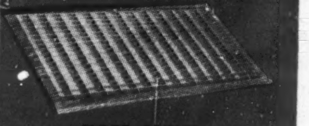
Available with Lock



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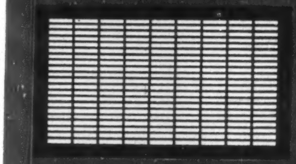
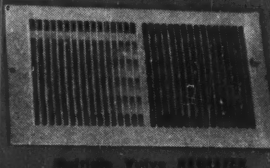
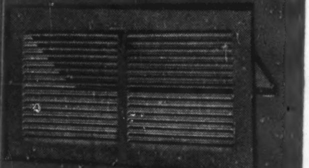
Close Mesh



ARCHITECTURAL GRILLES



Multiple Valve REGISTER



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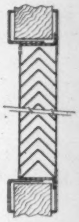
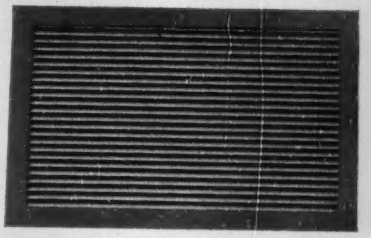
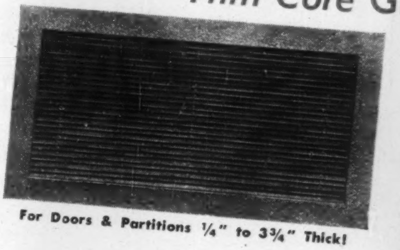




Thin Core GRILLES



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- **Cuts Installation Time Over 1/2!**
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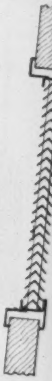
- **Complete — No Wood Moldings To Add!**

Telescoping auxiliary frame fastens to grille with posts and screws. Clamps tight. No holes to position. Practically ends danger of ruining door. All steel. No vision — 80% free area. All sizes — frame optional. Choice of finishes.



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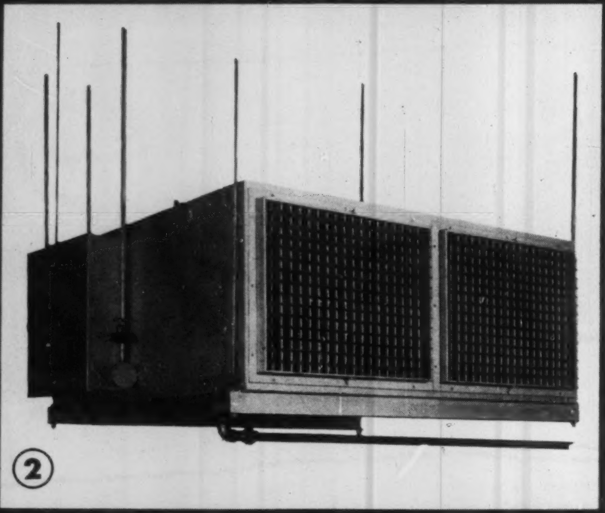
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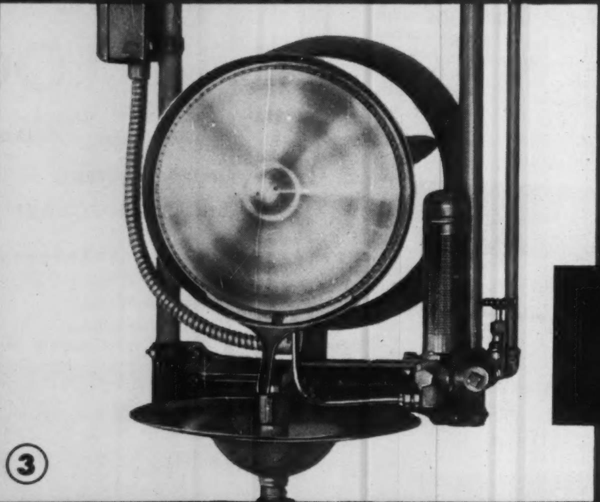
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AND HUMIDITY CONTROL

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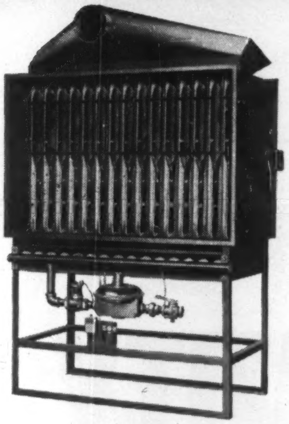
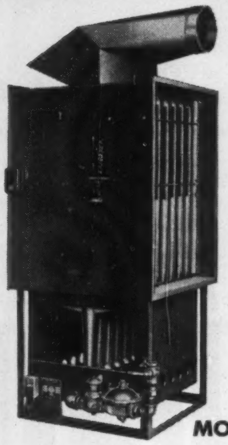
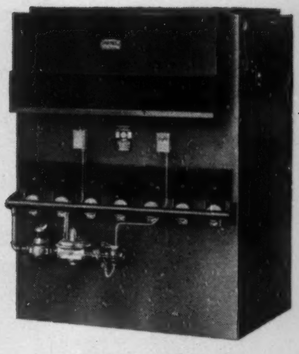


MODEL SED-E



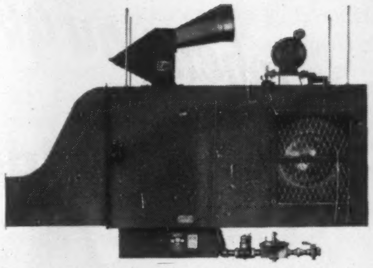
MODEL SED-S



MODEL SED-VF

MODEL SED-E — Non-corrosive type 321 stainless steel heat exchanger. Permits installation downstream of cooling equipment, for continuous blower operation. Air throughput in either direction. 80,000 to 600,000 Btu input.

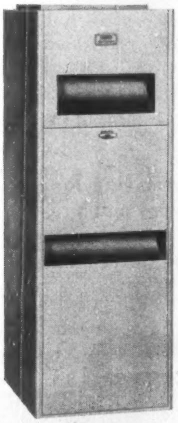
MODEL SED-S — Same as SED-E except controls are at the side, instead of at the end where accessibility requires either SED-E or SED-S is available in sizes from 80,000 to 600,000 Btu input in increments of 40,000 Btu.



MODEL SEU

MODEL SED-VF — Tested and approved as a duct furnace; type 321 stainless steel. Re-circulated or fresh air enters through bottom, sides, or back. Built in air bypass, vent in front. Sizes from 70,000 to 245,000 Btu input.

MODEL SEU — Suspended unit heater. Recirculates room air. Diffuser outlet with adjustable vertical and horizontal vanes. Double inlet forward curve blower. Continuous duty variable pitch drives, raised port burners.



MODEL SEC

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outstanding for
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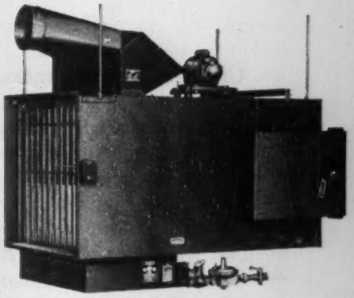

MODEL SES

MODEL SEC — Forced air furnace. Stainless steel heat exchanger sections seam and arc welded. One piece cast iron burners with driller ports. Oversize double inlet blower glass or washable filters. 6 sizes — 70,000 to 245,000 Btu input.

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MODEL SES—Forced air, suspended furnace for installation in suspended duct system. Inlet and outlet designed for sheet metal duct connection. Double inlet forward curved blower. Continuous duty variable pitch drives, raised port burners.

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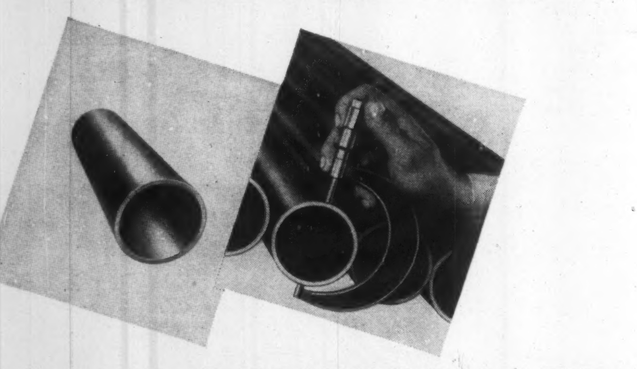
B&W Welded Boiler Tubes



Uniform wall thickness, diameter, and concentricity . . . uniform physical properties and characteristics . . . *consistent uniformity from tube to tube* for easier fabrication and rolling-in, greater strength, and longer life between retubings.

You'll find B&W Welded Boiler Tubes giving long and faithful service in boilers of all types and pressures—from the lowest to the highest—and serving the widest variety of applications. You'll recognize B&W tubes by their "brand".

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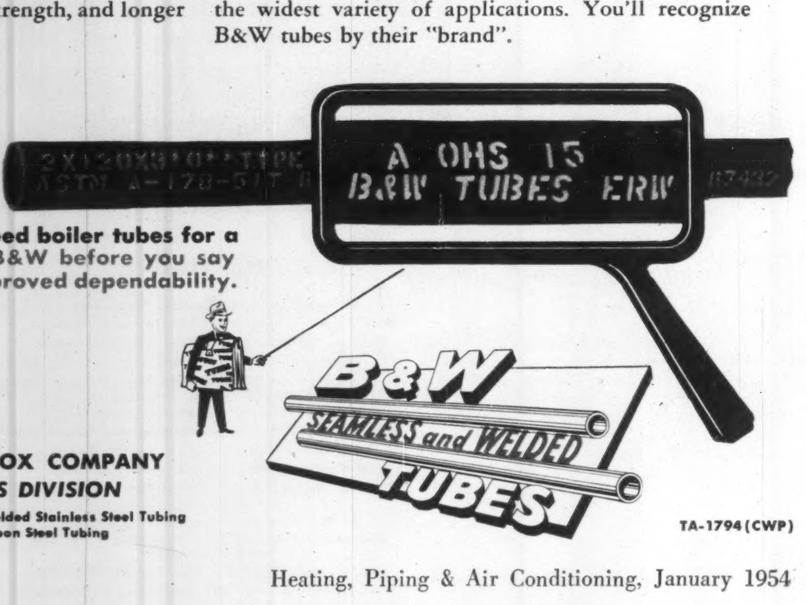
—wherever fine boilers are operating efficiently over extended periods.



***Ask for them* the next time you need boiler tubes for a new boiler or retubing job.** Say B&W before you say **WELDED BOILER TUBES—for service-proved dependability.**

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THE EDITORS' PAGES

A COMPLETE Directory Section of Heating, Piping and Air Conditioning Equipment for Industrial, Commercial, Industrial and Public Buildings — thoroughly revised and brought up-to-date — appears for the 20th consecutive year in this month's issue of HPAC (see the yellow pages). . . . The Directory Section is a plus feature of this month's HPAC, which also has the regular editorial content (including the Journal Section of the American Society of Heating and Ventilating Engineers.)

Office Building Air Conditioning Booming

OWNERS OF THE Fidelity Philadelphia Trust building, largest office structure in that city, have signed a contract for "the largest air conditioning system ever installed as one project in an existing building," it has been announced by Charles V. Fenn, vice president of the machinery and systems division of Carrier Corp. The order tops the record for complete systems in existing buildings set six months ago in the Standard Oil of Indiana building in Chicago.

The Fidelity installation highlights a trend toward office modernization through air conditioning which is booming throughout the country, according to Mr. Fenn. "For the first time in our history, we are currently executing more large contracts for existing buildings than for new buildings", he said. "At the same time, our overall orders for 'big' air conditioning are up nearly 40 percent over contracts booked for the same period the previous year".

Stewart M. Walker, president of the Fidelity Building Corp., which owns and operates the structure, described the installation as "the best way we know of celebrating a quarter century of service to our tenants through providing the finest possible accommodations."

The system is designed to maintain a temperature of about 76 F and 50 percent relative humidity. Occupants in the perimeter offices have individual adjustable automatic temperature control of their own space.

Three centrifugal refrigerating machines, two of 1000 tons capacity each and the third of 500 tons capacity, will supply the cooling. A cooling tower will be located on the central roof of the building. Apparatus penthouses are being constructed on the roof of the two wings and on a low roof in the rear court.

The air conditioning installation was designed by Charles S. Leopold, consulting engineer. The structural and electrical changes were designed by Day & Zimmerman, Inc., who were also serving as the general contractor. Mr. Leopold is a member of HPAC's board of consulting and contributing editors.

Plastic Pipe Test Methods Subject of SPI Program

METHODS FOR THE evaluation of plastic pipe will be established in an extensive engineering research program at Battelle Memorial Institute, Columbus, Ohio, being sponsored by 29 companies in the Society of the Plastics Industry who are extruders of various types of plastic pipe and suppliers of the raw materials.

The program is planned to develop effective test methods on such factors as bursting strengths, safe working pressures and long range serviceability of plastic pipe under static pressure and dynamic loading.

Various types of raw materials are presently being used in plastic pipe applications for the transmission of water in potable water supply systems; natural gas; oil; mine drainage; chemicals; beverages; and for varied irrigational installations. While these installations, which, in some cases, constitute field tests, have proved satisfactory, the plastic pipe manufacturers recognize that reliable test methods and engineering data must be developed, according to the SPI.

Plastic pipe sales in 1953 are believed to have exceeded $15 million, the SPI reports, compared with $500,000 in 1948.

LEO COLLINS (left), safety supervisor of The Detroit Edison Co.'s central heating department, talks over some safety business with Henry Wellfonder, safety observer at the Congress St. heating plant

Heating Department Sets Safety Record

THE CENTRAL heating department of The Detroit Edison Co. — comprising some 200 employees — is the only one in the company which has completed well over a full year without a single lost-time accident, according to an article in the November issue of the Synchroscope, which is published by Detroit Edison.

The central heating department gives all new employees detailed safety instruction before starting them on the job. Employees keep safety-minded by attending the monthly safety meetings and eventually each of them becomes a safety observer. Many other company departments follow the same routine.

Such rotation gives all central heating employees a close look at safety problems. Safety observers check work locations daily, solicit safety suggestions and complaints from associates, and conduct the safety meetings for their own work locations.

Leo Collins is safety supervisor of the central heating department. He has written a number of articles published in HPAC, is a member of HPAC's board of consulting and contributing editors, and is the recently elected second vice president of the National District Heating Association.

HPAC Index for 1953 Will Be Available

An index for HPAC's 1953 issues, Vol. 25, Nos. 1-12, including the Journal Section of the American Society of Heating and Ventilating Engineers, is being compiled and will be available soon to HPAC's subscribers on request. If you want a free copy, send a note or postcard to the Editors, Heating, Piping & Air Conditioning, 6 N. Michigan Ave., Chicago 2.

We'll keep your request on file until the index has been printed, and will then mail a copy to you.

"The Solid Gold Parking Space"

It's beginning to look as though downtown parking space is worth more than the autos it accommodates.

A survey by the Chamber of Commerce of the United States of 18 cities, most of them under 100,000 population, shows that the average value of a single parking space in terms of annual retail sales it produced was at least $20,000. The figure may be higher in larger cities.

> **"Quote"**
>
> "Everything — our economic system, growth in population, people's wants — points to more production. More production and more creation of those goods leading to still more production are needed to satisfy the desires of American people.
>
> "The challenge to American industry is to be ready to produce the goods and services which this growth in population and prosperity will demand. Over the years and for the long pull, the percentages have always favored those who planned big for America's future.
>
> "In their number, and in their potential lifting power, all the leading growth industries of today — ranging from air conditioning, through the alphabet of chemicals, to the all-encompassing field of electronics — without doubt surpass that of their counterparts of a generation ago by a very sizeable margin."—*Chester H. Lang, Vice President, General Electric Co., at a meeting of Detroit Rotarians.*

The value of individual parking spaces varied from about $10,000 in Newton, Mass., to $64,000 in Modesto, Calif., owing to differences in retail sales totals, the use of streetcars and buses for shopping, and other factors.

But the survey is a striking illustration of the value of downtown parking spaces to retail merchants and to a city generally. To cite one example, Silver Spring, Md., (75,000 population) has added 2000 off-street parking spaces since 1945. During the same period, real estate values have increased more than fivefold.

There's a play on Broadway called The Solid Gold Cadillac. It may be that by next season the title will have to be changed to The Solid Gold Parking Space.

Air Conditioning Helps the Poor Taxpayer

Increased economy in operation of Michigan's state government is foreseen with the official dedication in Lansing of the Stevens T. Mason office building — first in a series of new state buildings. Greater efficiency and easier maintenance are expected to result from the $500,000 air conditioning system, which is a feature of the new structure, according to the Carrier Corp.

During last September's heat wave, the federal government reported that it sent 25,000 workers in non-air conditioned offices home daily at 2 p. m. In the Stevens T. Mason building, this cost to the taxpayers will be eliminated in Michigan.

Cooling is provided by a 440 ton capacity absorption machine on the roof of the building and a 210 ton centrifugal machine in the basement.

The architects for the building were Smith, Hinchman and Grylls. Mario Branz was the mechanical contractor responsible for the air conditioning installation.

Stray Currents Cause Piping Corrosion

On large projects — such as refineries, power stations or industrial plants — where extensive d-c welding operations are involved on underground piping networks, serious corrosion may occur on the piping during construction if the ground connections on welding machines permit substantial currents to flow in the earth, warns H. W. Wahlquist, electrical engineer, Ebasco Services, Inc., in a "topic of the month" comment published in the journal of the National Association of Corrosion Engineers.

During the initial stages of construction, when the piping systems are not metallically interconnected, welding performed on one structure, using a ground connection on another structure, results in heavy current discharge to earth on one of the structures, depending on whether straight or reverse-polarity welding is used, he says. If the electrode is negative, as in straight polarity, the corrosion occurs on the structure used as a ground; with reverse polarity the structure being welded will corrode.

MARCH OF DIMES
FIGHT
INFANTILE
PARALYSIS
JANUARY 2-31

Urges Less Pressure in Training for Top Jobs

Industry's efforts to provide extensive and intricate training programs for executives may overburden the prospective top managers of industry and do more harm than good, business leaders attending the fall conference of the Society for the Advancement of Management were cautioned recently.

James S. Massie, of Minneapolis-Honeywell Regulator Co., emphasized that management programs must be tailored to the individual needs of the potential executive. Group programs, he said, should be conducted only where there are indications of compatible group interest.

A study of 250 top executives furnished an indication as to which areas they felt most needed "polish." For example, some 60 percent indicated they needed assistance in encouraging staff teamwork; 65 percent admitted having poor memories; 50 percent wanted polishing on their conference leadership techniques; and 50 percent indicated that they wanted more knowledge of business economics, finance and a better understanding of business organization and policies.

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Dirt Strainers

Lift Fittings

Expansion Joints

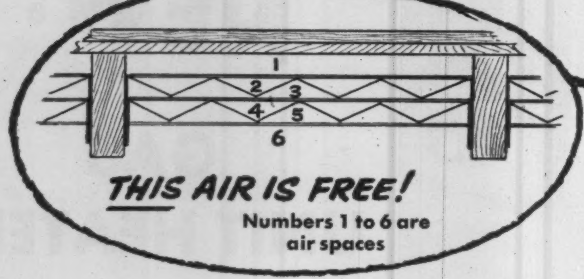
Vacuum Breakers

Gauges

Sight Glasses

Steam and Oil Separators

WHO SAID AIR IS FREE?



Were it not for Radiation and Convection, empty air spaces inside walls, roofs, etc. would be the best insulation. But why pay costly labor and storage bills for handling "free" air entrapped **before** it is used in bulky insulation? Bulky materials also require more freight cars, trailers and trucks. The "free" air is paid for over and over again.

Multiple accordion aluminum envelops large volumes of air and creates layers of air spaces **only** as it is opened when finally stapled in place. This air is **really** free.

With respect to radiant heat flow, the aluminum sheets have 97% reflectivity, and 3% absorptivity and emissivity. Low conduction results from the preponderant air spaces of low density. The layers of multiple aluminum and fiber retard inner and outer convection. The tough aluminum sheets are impervious to vapor flow. Infiltration under flat stapled flanges is slight. Condensation formation on or within is minimized by the scientific construction of multiple layers of joist-to-joist, full-depth accordion aluminum, fiber, and air spaces.

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Because of the low mass of unopened, practically airless multiple accordion aluminum, an ordinary passenger automobile will hold 20,000 sq. ft. of it without being or even looking overloaded. A standard railroad freight car, a huge interstate trailer, or a number of trucks would be needed to transport an equivalent amount of ordinary insulation.

A *new multiple accordion aluminum, Infra, Types 6-S*i*, and 4-S*i*, gives **edge to edge** insulation between beams or studs, forming a "blanket" of uniform depth against heat and vapor flow, and condensation formation.

The AMERICAN SOCIETY OF HEATING VENTILATING ENGINEERS has published a booklet which describes convection, conduction, and radiation heat flow through *ordinary* air spaces and what happens when an ordinary building space is lined or subdivided by reflective metals, thus creating reflective air spaces. Ask us for a copy—it's free.

*Patent applied for.

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in new construction between wood joists, material with labor,

Type 6-Si under 9½¢ sq. ft.
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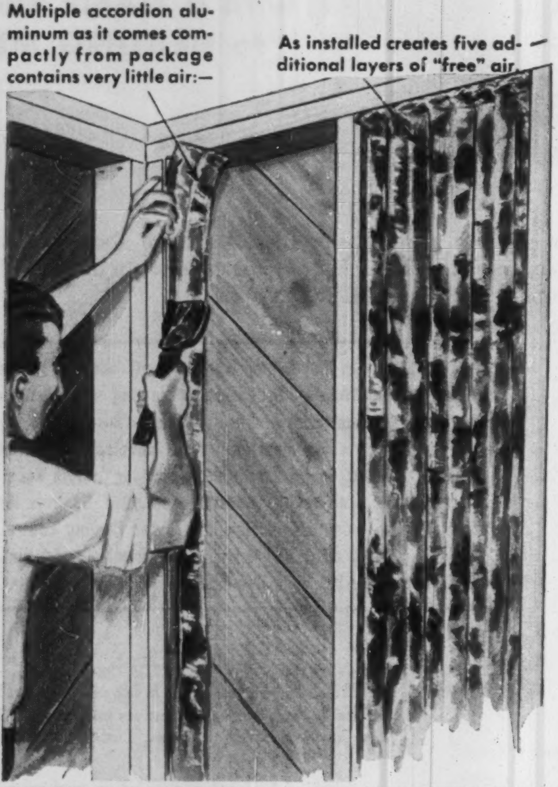
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"OPEN FOR DISCUSSION"

WE FOLLOW HERE each month the practice at engineering society meetings of providing an "open for discussion" period. You are urged to take part. Just address your comments to the Editors, Heating, Piping & Air Conditioning, 6 N. Michigan Ave., Chicago 2.

H. G. GREGERSON —

"I Read Article With Great Deal of Interest"

I READ WITH a great deal of interest C. T. Baker's article on How NOT to Air Condition, published in the November HPAC. Mr. Baker probably is stating the situation somewhat mildly, inasmuch as the evils of which he speaks are fairly common.

I know of no way by which prospective purchasers of air conditioning systems can be warned of the problems that may arise. The unscrupulous are certainly not going to forewarn the owner that the system he is getting is not going to function properly. It evidently is a problem of educating the public to the point where they will seek advice from qualified people rather than to listen to the first that comes along. If articles such as Mr. Baker's could be gotten into the hands of all of the people who are or will be interested in air conditioning, many of the sorry installations could be prevented.—H. G. Gregerson, Young, Gaynor & Gregerson, Consulting Engineers.

ALFRED J. OFFNER —

"It's Well-Known That Insulation Reduces Costs"

Mr. Neergaard's article on reducing hospital costs by the use of insulation and double glazing, which was published in the November HPAC, is constructive. It stands to reason that building insulation and double glazing will reduce both heating installation and operating costs, and most architects and engineers would so recommend.

The tables are interesting insofar as operating costs are concerned, but it should be noted that the total costs quoted include power and lights which of course would not be affected by building insulation and double glazing. It would have been better if a comparison between the use of insulation and double glazing and none for the same building had been given.

The statement that one engineer recommended three 150 hp and another two 100 hp boilers does not mean much until all the facts are known. While it is reported that the two boilers have given satisfactory service, is it not possible that a three-boiler plant might have given greater flexibility in operation and increased efficiency in fuel consumption and better breakdown protection?

The statement in the article about engineers "oftentimes" failing to take into account the reduction in heat loss due to insulation is a reflection on the engineering profession and I personally object to it. No competent and experienced engineer would ignore the fact that the building is to have insulation and double glazing in preparing his design. One that does so is not an engineer.—Alfred J. Offner, Consulting Engineer.

SAMUEL R. LEWIS —

"Statements Should Have Been Qualified"

THE QUOTATIONS in the article on hospital heating costs in the November HPAC to the effect that some unspecified value of insulation in walls can reduce the size of radiators and heating boilers 25 percent should be qualified. Also, the statement that double glazing alone can cause 50 percent reduction in the size of radiators and boilers should be less intemperate.

An over-stressed boiler usually is less efficient than one that is loaded normally. A radiator that is too small to heat a room always requires more heat input per unit of surface than would be needed if the room were heated.

These remarks are not intended to deprecate the author's plea for improved building construction.—Samuel R. Lewis, Samuel R. Lewis and Associates, Consulting Mechanical Engineers.

CHARLES F. NEERGAARD —

"I Would Like To Reply To Comments on Article"

I WOULD LIKE to reply to the comments on my article on hospital heating costs.

The comment from one engineer (published in the December HPAC) suggests "difficulty in getting a client that has enough money for this type of construction". This overlooks the facts presented that insulation of walls and windows adds little, if any, to the construction budget (given conventional fenestration) as the size of the heating plant can be reduced sufficiently to cover practically the entire extra cost of the increased thermal capacity. This probably would not apply to the large glass areas now common, which are inappropriate for the hospital, in my opinion.

Regarding another of the comments, if my article is read carefully, it will be noted that the type of wall insulation and the heat loss coefficient was described and that the quotation stated "If *in addition* to the insulation the windows are double glazed. . . . . the size of the radiators and heating boilers can be reduced 50 percent."

His remark is the characteristic excuse for over-design — it is claimed that 25 percent overload of a boiler in peak periods is both efficient and economical. One chart of temperatures and periods during a heating season in New York City shows that 80 percent of the radiation and boiler capacity was required for only 2.5 percent of the heating season, whereas 20 percent of the capacity was utilized 90 percent of the time. This is a rather convincing argument for the use of boilers smaller than load requirements to be operated at 25 percent overload when required 2.5 percent of the time.

The third comment, "that most architects and engineers would recommend insulation", is not in accord with my experience. The criticisms of the tables are, of course, valid. The only figures available are based on the standard hospital accounting system which includes power, light and heat — the comparisons are obviously only suggestive. To be scientific, we should have the cube of all buildings and the local cost of fuel — but who could assemble such data?

He is correct about three boilers being more effective than two. In all of our jobs, we recommend three boilers.—Charles F. Neergaard, Neergaard, Agnew, Craig and Westermann, Consulting Services in Hospital Planning, Organization and Management.

G. W. HAUCK —

"Was Piping Story an Actual Occurrence?"

The october HPAC contained a very interesting story by Bill Dopp, entitled How to Open a Stuck Valve.

Is this story based upon an actual occurrence which Mr. Dopp either witnessed or knows to have happened as related?—G. W. Hauck, Manager, Engineering Sales, Crane Co.

[*Editor's note*:—Another comment on this same article indicated that it was not felt the incident came from real life. This comment also stated "I'd hate to try the dry ice routine at the temperature and pressure involved for fear of getting into stress troubles, let alone hitting the drift." It was also pointed out that Mr. Dopp's comments on sizing were "good, but the solution was not carried through."]

The Author Replies — Here is the situation as Mac — the principal character in my article — found it.

The valve stem was under a compression load between the bridge wall of the valve and the threads of the yoke sleeve. What was that load? Suppose we assume that the valve body and bonnet had remained cold, the stem expanding under a temperature rise of 330 F. One of two things would probably have happened. Either the bridge wall would have cracked or the yoke sleeve threads would have let go. The latter is the most probable. The condition was, however, not that serious. The valve was hot throughout; there was an indeterminate initial load on the stem when the valve was closed, so that it is practically impossible to figure what load really did exist.

There are several ways in which Mac could have relieved that load. He chose to use two of them — contract the stem and expand the yoke. Inasmuch as the stem is firm at only one end, the contraction could not have created any new stresses. All that it could do was to relieve all or part of the compression load. Heating the yoke is an old trick that has been used by piping maintenance men for as long as I can remember.

Our friends who comment on the article overlook the one point that could have given Mac some trouble. In shortening the stem by cooling, he also reduced the diameter. If the packing had become rigid, this could have produced a packing leak that would have been quite troublesome (although temporary.)

As for the hitting of the drift against the body of a modern steel valve, the risk is of no consequence, it seems to me. These valves take a lot of abuse; they are built to take it. Knowing some of the things to which they are subjected, the taps that Mac gave that drift meant little. They did only what he intended they should do — broke the grip of the two metals. When you have seen the threads strip out of a gate valve yoke sleeve with 1800 psi of hot water inside and hear the disc hit the bonnet going at high speed, you won't worry about a few hammer taps.

As to my story being taken from "real life," every solution that Mac uses in solving the problems discussed in my articles has been used by me in one form or another. This story—like all of the others—was based upon an actual problem. The globe valve was stuck under the exact circumstances related. That valve was opened by shutting down the boiler and permitting the valve to cool by draining the line; this was an expensive and unnecessary procedure. I have used liquid air and both dry ice and liquid air to insert oversize seat rings in both valves and pumps several times. The common trick of heating the yoke is frequently used in just such problems. The valve, having pressure on both sides of the disc, made this procedure safe.

These stories are not based on single experiences. They are a combination of incidents and experiences that I have actually had or been a witness to. Every problem is figured from as many angles as possible and the solutions often submitted to expert opinion. This story had the benefit of "consultation."

As to the remark that the "sizing comments are good, but the solution is not carried through," this is an entirely separate story. Mac brought up that subject to provoke thought about a very common error in design. The sizing of bypass valves is a matter of meeting the requirements of each individual case. Load factors and pressure drop must be taken into consideration. As much thought should be given to sizing these valves as is given to sizing and selecting the regulator.—Bill Dopp.

CHARLES S. LEOPOLD —

"Many Variables in Setting Need for Air Conditioning"

Referring to the excerpt published in the December HPAC of the paper by Wm. T. Smith, describing the development of the Air Force method for determining when comfort air conditioning is essential, 80 F dry bulb and 50 percent relative humidity is *not* the most commonly accepted condition for operating air conditioning systems. It is the figure used in competitive selling. Systems are operated at not over 76 F and 50 percent whenever possible. Eighty degrees and 50 percent may be a satisfactory basis for Mr. Smith's analysis since it is not an unreasonable compromise with comfort.

This type of analysis is a reasonable approach for buildings which have good natural ventilation in areas where there is moderate or high wind velocity.

For buildings which require forced ventilation, either for reasons of security or exclusion of dirt, the analysis would have to be modified in that with a finite quantity of air there will be a temperature rise indoor above outdoor, so that the base wet bulb would have to be lowered.

The question of fenestration also poses psychological problems which will have a bearing on the need for air conditioning. Conditions which might be satisfactory in a building with open windows may prove unsatisfactory under conditions of forced ventilation, with no windows.

Mr. Smith has performed a real service in focusing attention on this problem and making one step toward its solution. If a satisfactory formula is ever evolved, I believe that it will include many more variable factors.—Charles S. Leopold, Consulting Engineer.

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Copper

WHERE IT COUNTS

4,800 FEET OF TYPE "L" REVERE COPPER WATER TUBE, IN SIZES FROM 1" TO 6" USED IN AIR CONDITIONING SYSTEM OF

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Take a good look at the two photographs below. Then visualize this same installation made with threaded fittings and think of the time that would have been consumed running these lines. No wonder more and more copper tube is being used for air conditioning, water and waste lines.

You don't have to worry about wrench room in the tight corners, solder joints are made much faster, present a much cleaner appearance. And you need never worry about replacing copper tube due to rust, for copper can't rust. There is no loss of flow or pressure, no allowance in pipe size need be made for rust accumulation with Revere Copper Water Tube. There are fewer fittings, too, on the long runs, as Revere Copper Water Tube comes in straight lengths of 20' in hard and soft tempers and 60' coils in soft temper. It's easy to bend, too.

Keep out of trouble, protect your reputation for quality work, with copper. Use Revere Copper for air conditioning lines, radiant panel heating, hot and cold water lines, underground service lines, waste stack and vent lines, processing lines. See the Revere Distributor nearest you today. And, if you have a technical problem, he will put you in touch with Revere's Technical Advisory Service.

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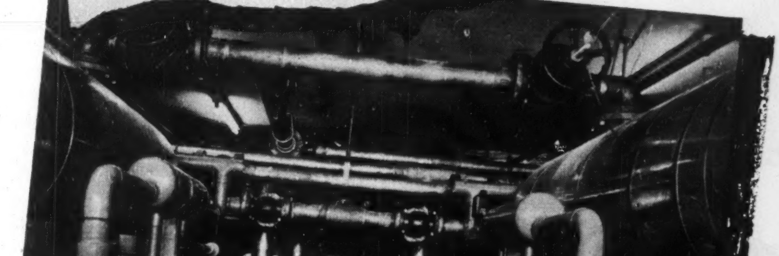
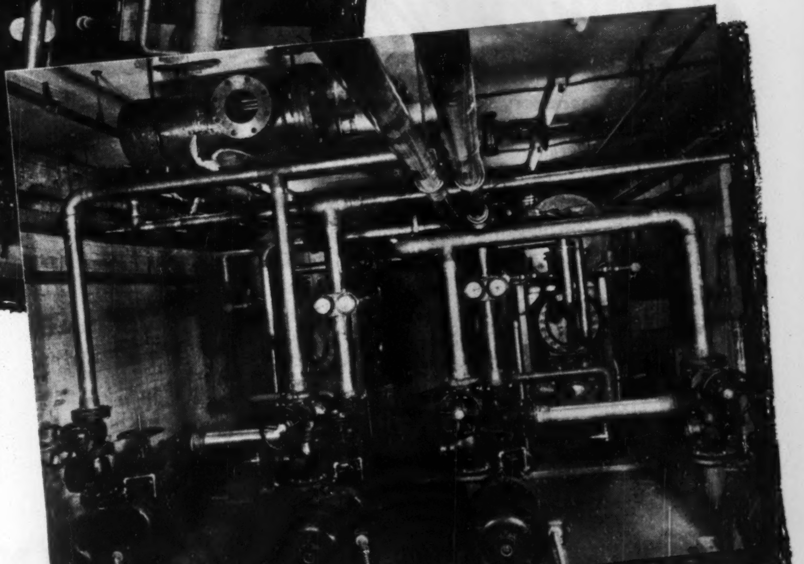


(Above)

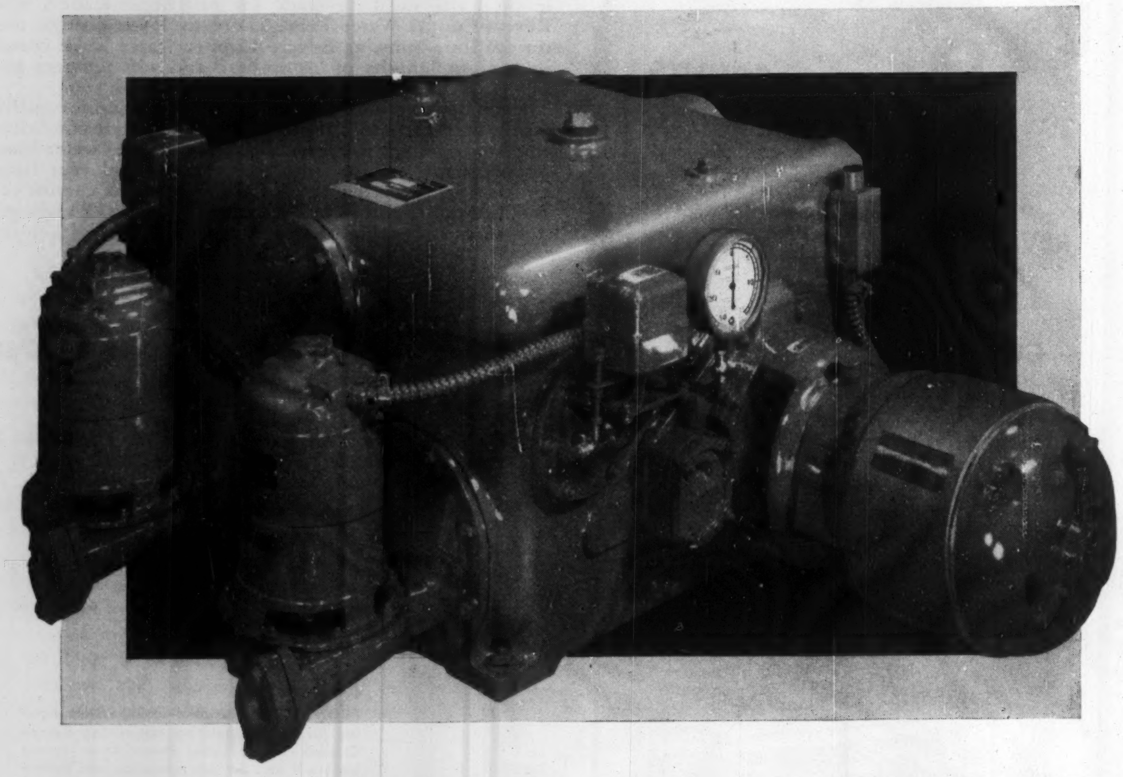
REAR VIEW of system which air conditions the entire building of 9 floors, and has a capacity of 150 tons. Cooling tower is located on roof. System was completely installed by H. E. CROOK COMPANY, INC., Plumbing, Heating, Electrical and Air Conditioning Contractor. Tube was supplied by Revere Dist., J. T. ROBERTS & BROTHER, INC., both of Baltimore.

(Below)

FRONT VIEW of air conditioning system showing the neat-appearing, non-rusting Revere Copper Water Tube. Photo shows system before it was put into operation and before cold water lines were insulated.



THIS NEW VACUUM HEATING PUMP IS SIZED TO ACTUAL JOB REQUIREMENTS



It's the Nash CSM

No longer is it necessary for the Engineer to accept a vacuum heating pump with air and water capacities based inflexibly upon square feet of equivalent direct radiation. With the flexible Nash CSM he can provide for proper air capacity in accordance with his judgment and experience. For the individual capacities of the separate pumps on the CSM may be varied within a wide range, without buying an oversize receiver and oversize water pumps.

These pumps possess many other features which permit a more efficient utilization of fuel and minimum use of electric power. Low, low, returns reduce installation costs and usually eliminate putting the pump in a pit. Simplicity and efficient operation reduce supervision and maintenance costs. Information regarding this new heating pump development is available immediately upon request.

- ✓ **Increased air capacity induces rapid system response without wasteful overheating.**
- ✓ **Separate air and water pumps individually selected to meet actual job requirements.**
- ✓ **Control system that operates individual pumps only when needed.**
- ✓ **Flexibility permitting addition of radiation without changing basic pump installation.**
- ✓ **Low, low, return line connection.**

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• Mr. Wiggs describes here "a new concept in the construction and comfort conditioning of large office buildings." He gives a detailed description of and illustrates a new ceiling system which combines radiant heating and cooling, recessed water cooled fluorescent lighting units, acoustic treatment and concealed sound or paging loudspeakers, as well as diffusers and ducts for the supply of conditioned air, used in the big head office building for the Manufacturers Life Insurance Co. at Toronto. He describes also the zoning of the piping system and the conditioned air supply system. The controls of the radiant heating, cooling and air conditioning are also covered, as are other details. Charles S. Leopold was the associate consulting engineer for air conditioning and heating.

MANUFACTURERS LIFE—one of the largest insurance companies in the world — requires a modern office building to meet its special needs

"New Concept of Comfort Conditioning"

. . . is demonstrated by Toronto's new Manufacturers Life building

By G. Lorne Wiggs
Senior Partner
Wiggs, Walford, Frost & Lindsay
Consulting Engineers

CONTRIBUTING GREATLY to the rapidly changing skyline of the city of Toronto, and to its uptown movement of office buildings, is the completion and recent opening of the head office building of the Manufacturers Life Insurance Co. The opening brought to a successful conclusion a new concept in the construction and comfort conditioning of large office buildings.

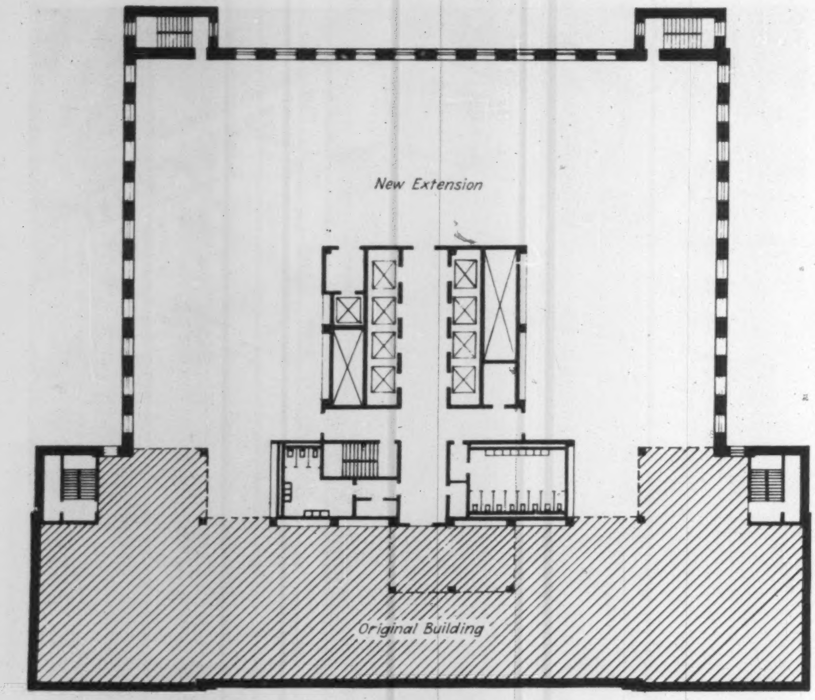
Manufacturers Life — with assets exceeding $500 million — is the second largest Canadian life insurance company, and is rated as one of the 25 largest life insurance companies in the world. Because of its size and in order that it can operate efficiently, the company must have a large and modern head office building, designed to suit its special needs.

The head office was built in two stages. It consists of the original six story building with a new 12 story addition erected at the rear of the original building to form an integrated whole. The original building was designed by Sproatt & Rolph, architects, and was completed in 1925. It provided 50,000 net sq ft of floor area, having floors approximately 193 ft by 40 ft without columns, with two extensions to the rear, each about 40 ft by 18 ft. It was heated by means of a hot water heating system and was designed for the best utilization of natural light and ventilation.

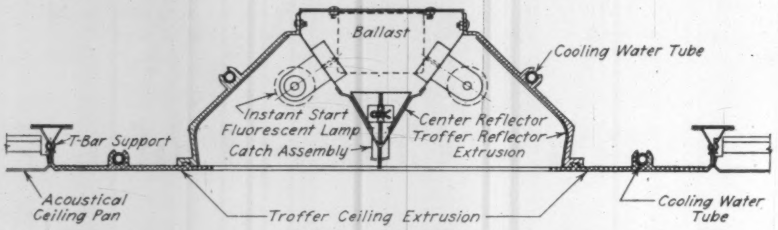
The new addition was designed by Marani & Morris, architects, together with Wallace and Carruthers, structural engineers, Wiggs, Walford, Frost and Lindsay, consulting mechanical and electrical engineers, and Charles S. Leopold, associate consulting engineer for air conditioning and heating.

Air Conditioning Required

The architects and engineers were instructed to design the new addition



ORIGINAL SECTION was completed in 1925. The new 12 story addition was erected to form an integrated whole



THE LUMINAIRES for lighting have water cooled reflectors to absorb the greater part of the heat emitted by the lamps, and water cooled extensions to absorb heat given off by occupants

to blend in with the original portion, to maintain the large, clear, open floor spaces, and to provide maximum flexibility of office arrangement, efficient operation and low maintenance costs. An additional requirement was that it should have year ’round air conditioning, good lighting and acoustic ceilings. Furthermore, the design of the new addition was to be such that its floor levels were exactly the same as those of the original building and that by renovating the original building in the same manner, the office space in both the old and new portions of the building would be the same. Thus, the building as it now stands provides a total of about 228,000 net sq ft of first class office space.

The structure is now a building having a central core surrounded by clear office space having 50 ft clear spans. The center core contains the elevators, the washrooms and spaces for the vertical air ducts, the main heating and cooling risers, the plumbing stacks and all the electric risers. All floors have a clear ceiling height of 9 ft, 4 in.

The original building had been provided with a cafeteria, a health center and some lounge and recreational space. Because of the greatly increased occupancy of the new building, it was necessary to abandon all of these and to provide larger and better facilities for them in the new portion. The lounge and recreational space is now on the ground floor. The cafeteria is on the second floor along the back of the building, with its kitchen immediately above it on the third floor.

The basement is occupied by the shipping and receiving rooms, the securities vault, and other necessary facilities. A sub-basement is provided for the installation of a large portion of the mechanical and electrical equipment. Machinery and equipment rooms on a portion of the 11th floor and on the entire 12th floor provide space for the elevator motors and controls and for a large part of the mechanical and electrical equipment.

A separate service building, about 130 ft northwest of the main building, houses the boiler plant, the refrigerating machine for cooling the building, and the transformers, with the cooling tower for the refrigerating machine on the service building roof. A walk-through tunnel connects the service building to the main building.

Construction of the new addition was started in June 1950. Partly due to the Korean hostilities, and the inauguration of intense defense construction, considerable delay occurred in its erection. As a result, the addition was not completed and occupied until October 1952. The staff then moved from the original building into the new portion and the original portion was rehabilitated. This was accomplished by removing its entire interior finish, as well as all of the existing mechanical and electrical services. The original portion was then equipped with the same mechanical and electrical services as the new portion and furnished with the same interior finish. Like the new portion, it was also supplied with storm sash.

Radiant Heating, Cooling

When the author’s firm was retained by the architects for this building, we had already set up our own research installation to test the performance of aluminum panels for radiant heating and cooling and also had designed and were designing a number of radiant heating and cooling systems combined with recessed lighting, acoustic treatment and air conditioning. An early installation of this type in Canada was that in the head office building of the Dominion Textile Co. Ltd., completed almost two years before the Manufacturers Life building was completed.

Charles S. Leopold, consulting engineer, of Philadelphia, has done extensive research work on radiant cooling and has had a pilot installation in operation in New York. Mr. Leopold's services were retained to work in collaboration with the author's firm on the radiant heating and cooling, as well as the air conditioning. The boiler plant, the fire protection, the electric system and the plumbing were completely designed by the author's firm.

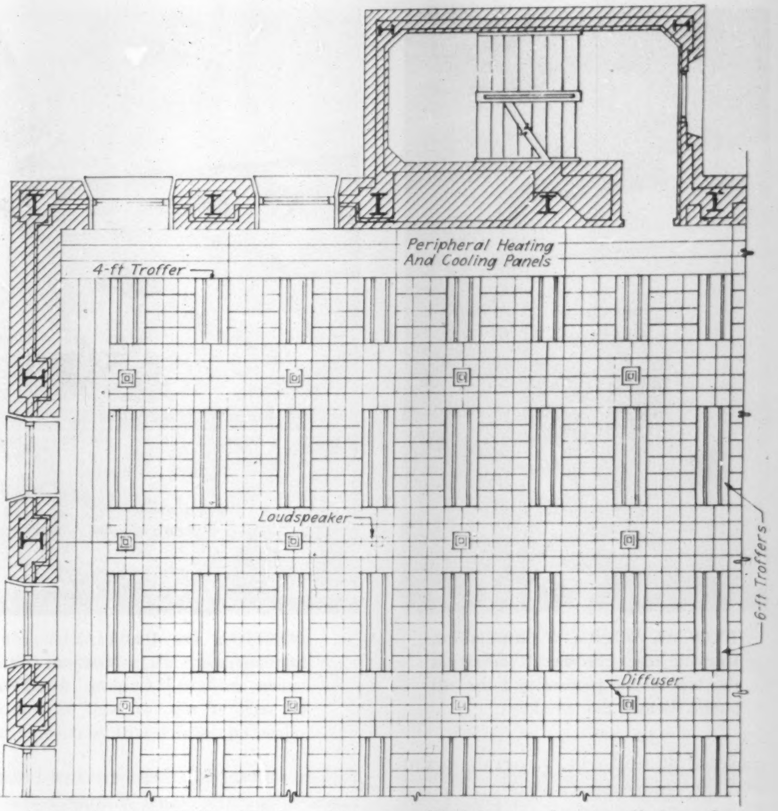
Of all the features in the Manufacturers Life building, the ceiling system represents — in the author's opinion — one of the latest and one of the most original developments in office building construction. In addition, its conception and application was one of the features of the building which required the greatest engineering skill and the closest cooperation between the architects and all the engineers. In fact, in order to produce a completely integrated ceiling system, it was necessary that the entire suspended ceiling, including its suspension and supports, be planned and developed very carefully for incorporation on the architectural drawings and so that the exact positions of the exterior walls could be fixed to fit the ceiling system.

The ceiling system combines radiant heating and cooling, recessed fluorescent lighting, acoustic treatment, and concealed sound or paging loudspeakers as well as diffusers and ducts for the supply of conditioned air.

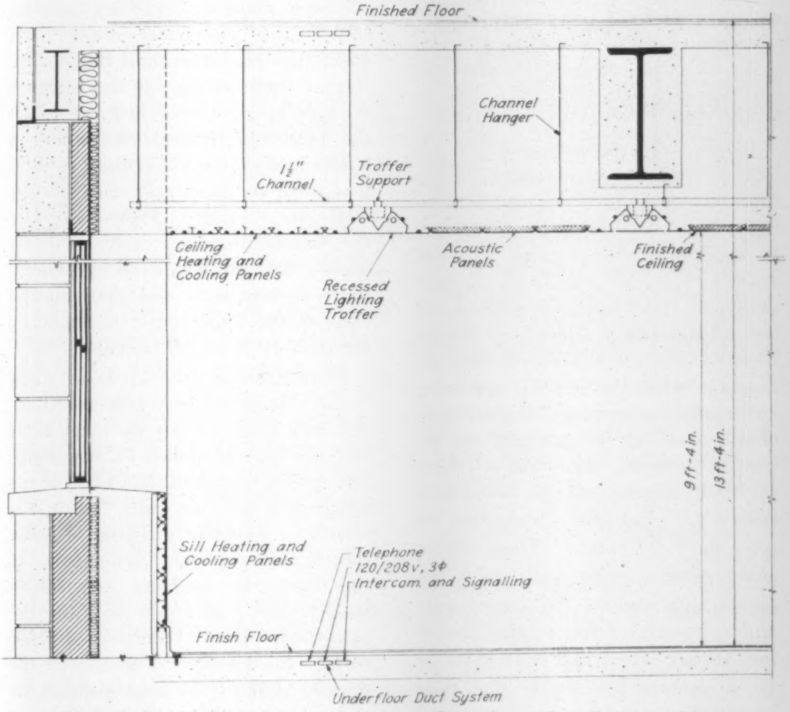
Of all these elements, experience had shown that the location of the radiant heating and cooling panels is not particularly critical. Neither is the location of the air supply diffusers and of the acoustic treatment. On the contrary, the location and spacing of the luminaires must be fairly exact if uniform light intensity is to be obtained over the entire floor area. Besides this, the placing of the luminaires was limited to a large extent by the window spacing.

Finally, the spacing of the loud speakers for the sound system had to be moderately uniform.

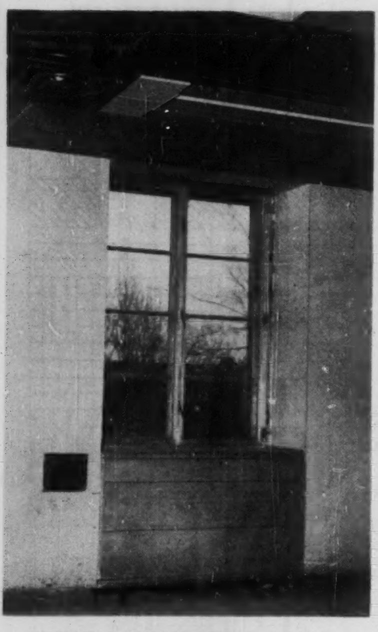
Combining all the elements with a ceiling pattern which would be


Peripheral Heating
And Cooling Panels
4-ft Troffer
Loudspeaker
6-ft Troffers
Diffuser

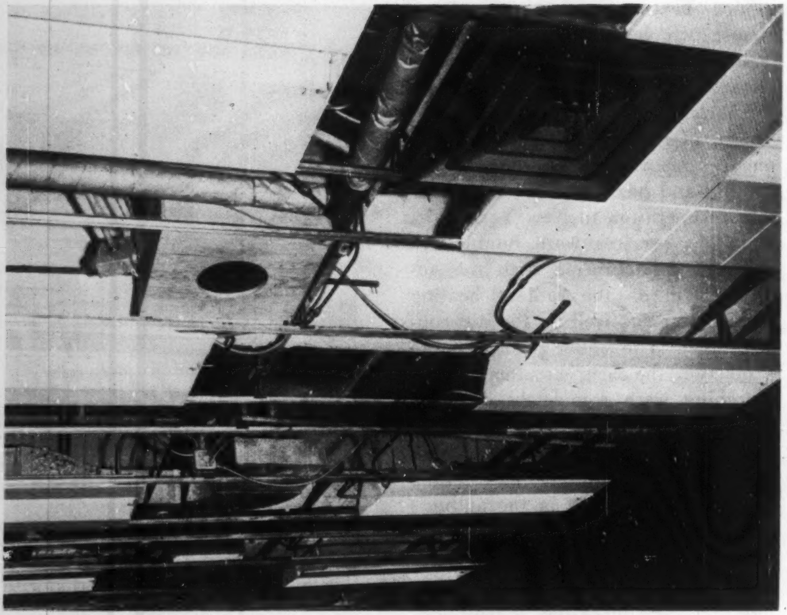
THE REMAINDER OF the ceiling was filled in — after installation of the luminaires and their extensions — with perforated steel acoustic pans covered with acoustic material


Finished Floor
Channel Hanger
1½" Channel
Troffer Support
Ceiling Heating and Cooling Panels
Recessed Lighting Troffer
Acoustic Panels
Finished Ceiling
9 ft-4 in.
13 ft-4 in.
Sill Heating and Cooling Panels
Telephone
120/208v, 3Φ
Intercom. and Signalling
Finish Floor
Underfloor Duct System

THIS SECTION through part of a typical floor shows the relative positions of the peripheral panels, the sill panels, the luminaires, etc.



TYPICAL WINDOW installation, showing the peripheral panels at the top of the picture and the sill panels below the windows



PORTION OF PARTIALLY completed section of ceiling, showing 6 ft luminaires to left at bottom, 4 ft units on right, and square diffusers between troffers. Cooling water connections to the luminaire panels may be seen at top, as well as loudspeaker for sound system, pipes, electric wires, etc., which will be covered by the finished ceiling

reasonably uniform in arrangement and of good appearance in large open areas, yet be adaptable and flexible enough to accommodate partition changes without these affecting the heating, cooling, ventilation or lighting required very careful development of its component parts and precise planning of the whole.

Removing Heat from Lighting

In planning the ceiling system, it was first necessary to decide on the type, size and spacing of the lighting units and on the lamps for these. It was decided to adopt recessed fluorescent luminaires, without louvers or glass panels, but equipped with instant-start fluorescent lamps so as to give the highest possible efficiency with the lowest operating and maintenance costs. In order to obtain uniform lighting and an attractive pattern, since the windows are on 10 ft centers it was found necessary to place the luminaires in rows on 5 ft centers. Then, except along some exterior walls, in a few places surrounding the center core and a portion of the original building, it was found that 6 ft units on 10 ft centers best suited the floor plan. Where 6 ft units could not be utilized, the luminaires were reduced to 4 ft units. All these are two-lamp units, using the same diameter fluorescent lamp in the two lengths.

After the exact positions of the luminaires had been fixed, a band of extruded aluminum radiant cooling and heating panels, generally 3 ft wide, was placed around the perimeter of each ceiling for the purpose of supplying radiant heat to offset the heat loss through the walls in winter and to provide radiant cooling to absorb the heat gain through the walls in summer. Following this, the location of the conditioned air supply diffusers was fixed by placing them in line with and between the ends of the luminaires, thus placing them on 10 ft by 10 ft centers.

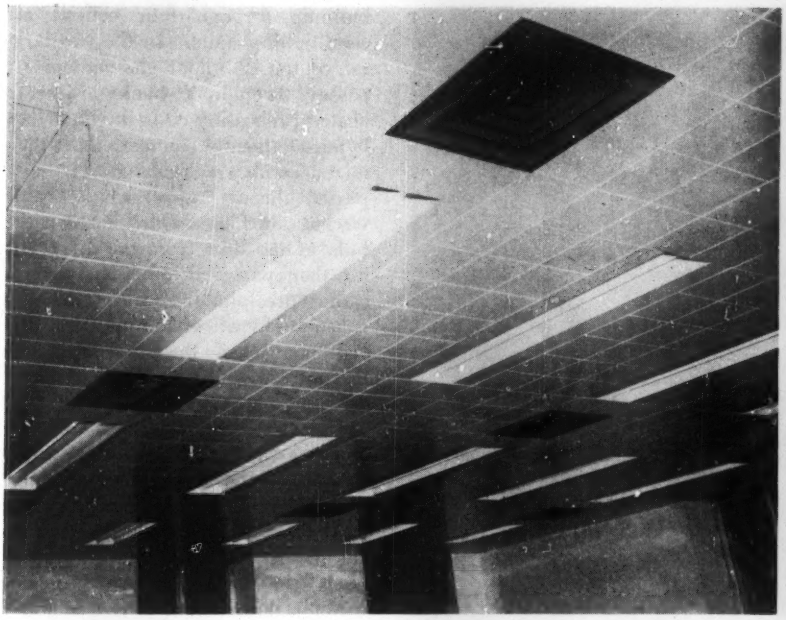
In such large floor areas as those in the Manufacturers Life building, the heat given off by the occupants and the heat produced by the lamps can readily be taken care of in areas adjacent to exterior walls — but it is usually a problem difficult of solution in the large interior spaces. In this case, the problem was solved simply and effectively by the development of a luminaire having water cooled reflectors to absorb the greater part of the heat emitted by the lamps and their ballast, and water cooled flat ceiling extensions (forming part of the unit) to absorb the heat given off by the occupants in its vicinity. The luminaire, including its two ceiling extensions, is exactly 2 ft wide and its edges are turned up and so shaped that they can be inserted into and securely held in the T-bar supports which hold up the perforated steel acoustic ceiling pans.

The remainder of the ceiling was then filled in with perforated steel acoustic pans, each 12 in, by 24 in. Each of these was covered with a pad of acoustic material, except those pans immediately below the loudspeakers for the sound system.

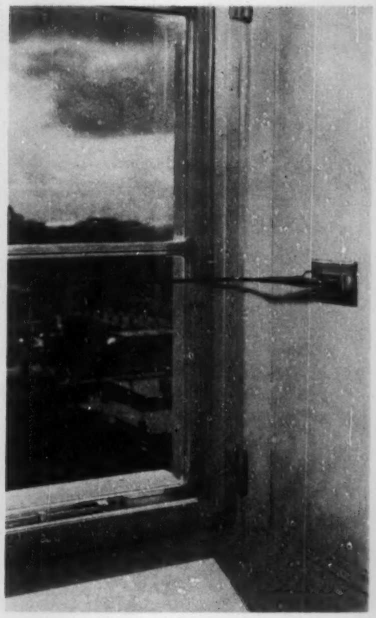
Panels Under Windows

In addition to the radiant panels around the ceiling perimeters, a radiant panel is placed under each window. These sill panels provide radiant heating in winter and radiant cooling in summer, having been designed to offset primarily the radiation from the windows to the occupants in summer and from the occupants to the windows in winter. The extruded aluminum stools fastened to the sill panels — together with the latter, in winter — serve to offset downdrafts from the windows.

All of the radiant panels, includ-



FINISHED CEILING covers the pipes that supply the water for radiant heating and cooling, the ducts that deliver the conditioned air to the diffusers and the electrical conduits to the loudspeakers and luminaires



THERMOCOUPLES held tightly against the inside glass control the sill panel zones

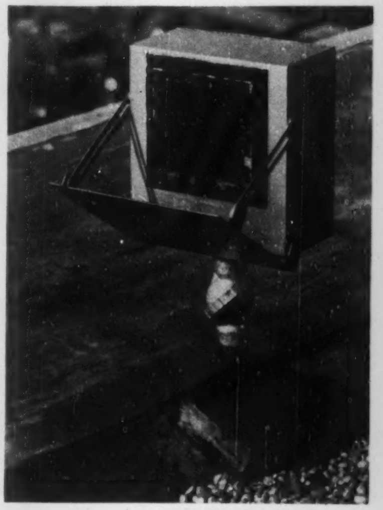
ing those incorporated in the luminaires, are aluminum extrusions which were designed jointly by Mr. Leopold and the author and made in Canada, based on the extruded aluminum panels developed by Mr. Leopold in the United States. In the spaces provided on the back of the extrusions, ½ in. OD copper tubes were drawn in and then expanded, to insure a tight fit between the tubes and the extrusions.

The Piping Circuits

The copper tubing in each luminaire, in each sill unit and in each peripheral unit was arranged so that it formed a single serpentine coil. The serpentine coils were piped up, generally in series of four units, to branch mains and risers, which were divided up into one circuit for the interior troffer panels and 12 circuits for the sill and peripheral panels. The piping for the latter circuits was divided up and zoned according to the orientation of their adjoining exterior walls and also according to the service of the panels. Thus, four circuits, each for a different orientation, were provided for the sill panels. Four circuits — also, each for a different orientation — were installed for the ceiling panels around the perimeter of the building. Each of these eight circuits was furnished with its own heater, connection to the chilled water circuit, circulating pump and controls. Four more circuits — also, each for a different orientation — were provided for radiant panels designed to offset the effects of solar heat in summer and to be shut off in winter. Each of these circuits was thus furnished with a connection to the chilled water circuit, a circulating pump and a solar heat control.

The circuit to which the luminaire cooling panels in the interior of the building are connected is the 13th and largest circuit. It has a pump which circulates chilled water. The temperature of the water in this circuit is controlled by means of a lighting load compensator, which is in turn activated by a current transformer connected to one of the main lighting feeders. This control varies the cooling water temperature in the luminaires between 65 and 70 F, depending on the lighting load on the feeder.

It should be pointed out that in general all the electric wires are run in rigid iron conduit but there is a short length of flexible iron conduit run between each luminaire and a junction box in the conduit.

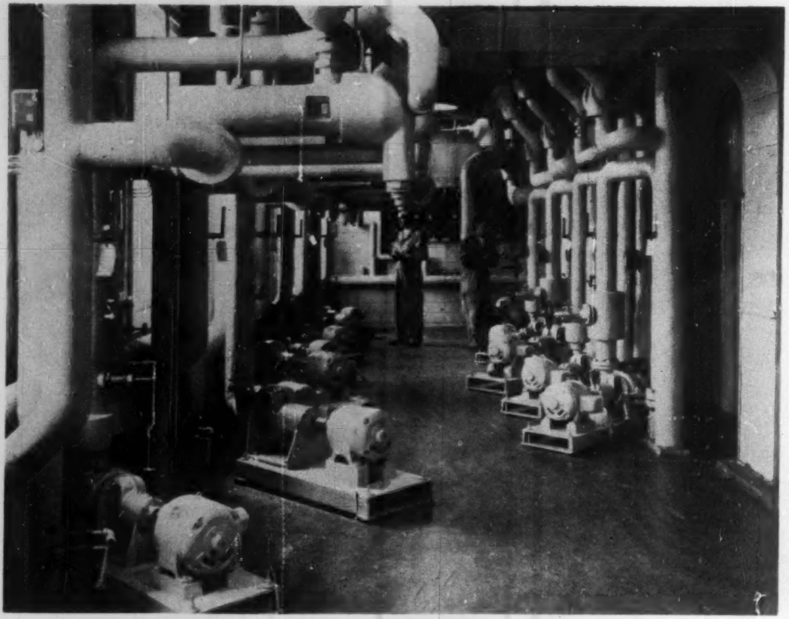


SOLAR COMPENSATORS face east, south and west. They control water temperature in the solar zones. This one is on the penthouse roof

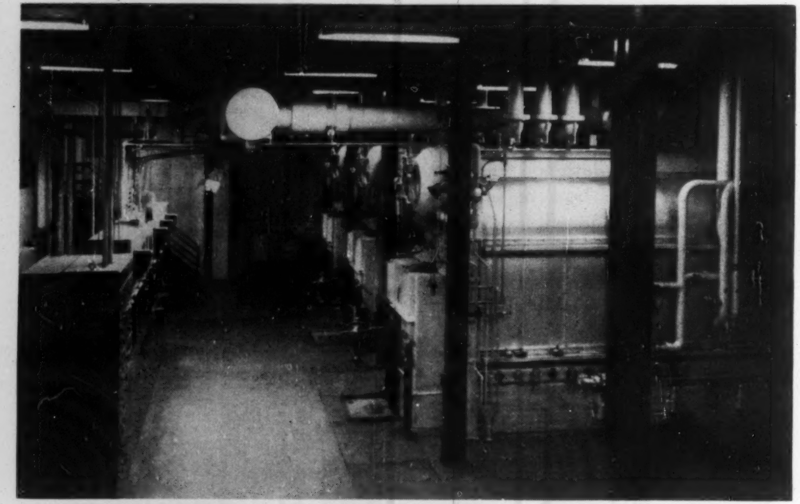
All of the heat exchangers, circulating pumps and control valves for the radiant heating and cooling circuits are in one equipment room on the 11th floor.

Conditioned Air Supply

The conditioned air supply system is typical of any other first-class air



PUMPS, HEAT EXCHANGERS, control valves and their connections for some of the circuits are at the left in this photo of the 11th floor equipment room. The pumps, control valves and connections for the solar zones are also shown



BOILER PLANT comprises three water tube steam boilers, each rated at 7500 lb per hr of steam. They are oil fired. Boiler room has space for two more units

conditioning system for a large office building, with a few notable exceptions. The air circulated through the areas having cooling panels is only a small part of that which must be circulated in a conventional system. In general, it amounts to about 0.4 cfm per sq ft of floor area in the interior part of the building and between 0.6 cfm and 1 cfm per sq ft of floor area along its perimeter.

The conditioned air in these areas is supplied at a constant temperature of between 62 and 66 F the year 'round, except during the night and for a short period each morning before the building is occupied, and at constant humidity the year 'round, except in those few places where booster heaters are installed in the supply air ducts.

Outdoor air is taken into the building through four central air conditioning units. In the two largest, on the 12th floor, the outdoor air passes through a bank of steam heated preheating coils in winter but bypasses them in summer. It is then mixed with recirculated air and passed through a set of cleanable viscous air filters which remove the bulk of the dust from the air. The air then passes through an electrostatic precipitator which removes substantially all of the oily soot and the balance of the dust from the mixture of outdoor and recirculated air.

From the precipitators, the air enters a two-bank air washer which humidifies the air supply in winter and dehumidifies it when required in summer, as well as further purifying it. In addition, each air washer cools the supply air in summer through the medium of chilled water circulated through it.

On leaving the air washer, the air passes through a bank of initial reheaters, which serve both to partially reheat the supply air and to cool the panel cooling water at the same time. The supply air then goes through the final bank of reheaters, which are hot water-heated and which heat the air supply up to the desired final air temperature.

The conditioned air then goes to the supply fan of the unit, which blows it through one or more concealed vertical sheet metal ducts to branch ducts run concealed in the ceiling spaces and thence through the ceiling diffusers. One unit, having a capacity of 62,245 cfm, provides all the conditioned air for the office space in the new extension while the second, with a capacity of 32,935 cfm, supplies the conditioned air to the office space in the original building.

The other two central air conditioning units, located in the subbasement, are similar to the first two in that they contain outdoor air preheaters, cleanable viscous air filters, electrostatic precipitators and supply fans — but they are provided with spray coil dehumidifiers instead of air washers. One unit, having a capacity of 9000 cfm, supplies conditioned air to the kitchen on the third floor only. Unlike the two penthouse units, it has only a single bank of hot water heated reheaters. The second central air conditioning unit in the sub-basement has a capacity of 30,280 cfm. It supplies conditioned air to the cafeteria on the second floor, to the lounge on the first floor, the basement and the sub-basement — each through its own supply unit which is provided with dehumidified air and recirculated air connections and dampers, viscous filters, hot water reheaters and a circulating fan.

In addition to these supply and recirculating systems, there is a relief fan in the sub-basement connected to each of the supply systems in the sub-basement, so that the surplus recirculated air can be exhausted to the atmosphere. There is also a large recirculating and relief fan on the 12th floor, as well as a toilet exhaust fan and a kitchen exhaust fan also on the 12th floor.

Treated recirculating systems are also provided for the main entrance vestibule, the entrances on the east and west sides of the building, and for the securities vault.

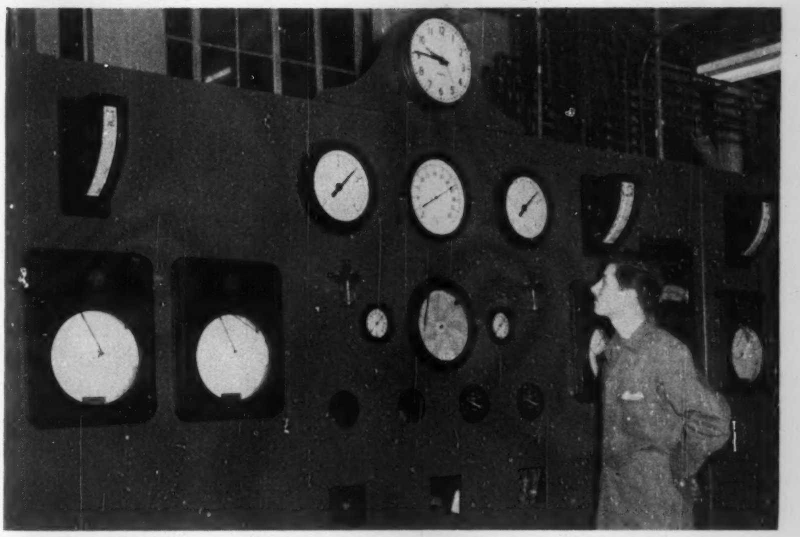
Elaborate Control System

The entire radiant heating and cooling system and the conditioned air systems are controlled automatically by means of an elaborate and extensive control system. This is a pneumatic system, except for a few controls which are available only in electrical instruments. Appreciable use has also been made of recorder-controllers.

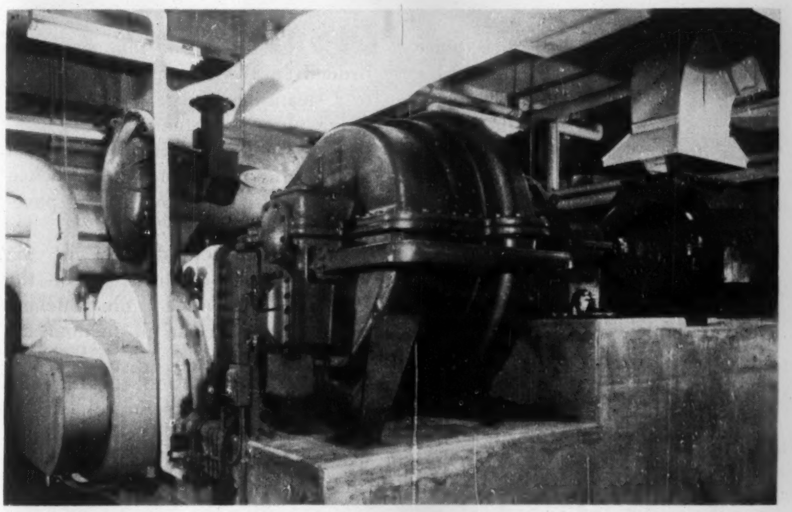
Each sill panel zone is controlled by a thermocouple held tightly up against the inner surface of the glass in the inside window (the windows are double casement type throughout the building.) The temperature of the water in each of the solar zones is controlled by means of a solar compensator, which is a photoelectric cell mounted behind a plate of blue glass in a weatherproof box. One solar compensator faces east, one south and one west. The temperature of the water in the interior zone, which contains the troffer cooling, is controlled by means of a lighting load compensator, in turn activated by a current transformer connected to one of the main lighting feeders.

The installation was designed originally with the peripheral radiant heating and cooling panels controlled by means of outdoor master thermostats resetting sub-master thermostats in the flow mains. The luminaires next to the peripheral panels were to be controlled by means of the solar compensators. However, the outdoor master thermostats have not been installed as yet and ever since the substantial completion of the building, the peripheral panels have been controlled by the solar compensators. As the controls are installed for the present, the solar compensators will control the water temperature in the peripheral panels except when the inside glass surface temperature at the window thermocouples drops to 55 F or lower, when by means of switching relays, the control of the water temperature in the peripheral panels is compensated by the inside glass temperature rather than by the solar compensators.

This method of control proved satisfactory during the hot spell which occurred in Toronto during late August and early September, when the outdoor temperature reached 100 F. It also maintained reasonable comfort conditions during the last heating season while the building was still being completed. The formal



INSTRUMENT AND CONTROL panel provides for all the boiler instruments, oil burner controls, and a number of indicating and recording instruments



SINGLE 800 TON centrifugal refrigerating unit has capacity to cool about 2000 gpm of water from 51.9 to 43 F when supplied with 2000 gpm of condenser water at 85 F

ELECTRICAL DISTRIBUTION board has pushbuttons and indicating lights, each connected to a different motor. Each motor must be started at its respective location, but may be stopped either at its starter or at the sub-basement distribution board

opening of the building took place Monday, September 28, 1953. Now that it is completed and fully occupied, the performance of the installation during its heating cycle and the resulting comfort of the occupants will be carefully checked. A special installation of testing and recording instruments has been provided for this and other testing or research.

In a number of special cases — such as the executive offices — individual temperature control is accomplished by the provision of booster heaters in the conditioned air supply ducts. Each booster heater is hot water heated and controlled by its own thermostat and control valve.

The hot water which is circulated through the reheaters in all the air conditioning units on the 12th floor and in the sub-basement, as well as all the hot water circulated through all the booster heaters in the building, is heated in a large steam heated converter on the 12th floor. This converter is of the shell and tube type and has an output of 5,000,000 Btu per hr when heating 500 gpm of water with steam at 10 lb pressure.

Snow Melting for Ramp

There is a separate heating system for the pavement of the ramp down to the delivery and receiving room, as well as for the driveway outside that room. This system consists of a series of serpentine pipe coils imbedded in the pavement, connected to a steam heated converter, a circulating pump and the necessary controls. The system is filled with a nonfreezing solution, which when heated melts the snow on the pavement to keep it clear.

Steam is used directly in the kitchen, in the cafeteria and in the laundry adjacent to the kitchen. Steam is also used in all the domestic hot water heaters.

The steam required for the outdoor air preheaters in all of the central air conditioning units, for the many converters and heat exchangers, and that used directly in the kitchen, laundry and in the domestic hot water heaters is generated in a new central steam boiler room constructed underground adjoining the service building. This boiler plant provides, in addition, the steam required for the snow melting system.

Three Steam Boilers

The boiler plant consists of three water tube steam boilers, each having a continuous rating of 7500 lb per hr of steam and operated at 40 lb pressure. Space is provided for two additional boilers to take care of future building expansion. The boilers are equipped with fully automatic oil burners suitable for burning No. 6 fuel oil and with air puff soot blowers. Two 12,000 U.S. gal heavy fuel oil storage tanks and one 600 U.S. gal light fuel oil tank are buried in the ground close to the boiler room.

A single instrument and control panel for all the boiler instruments, oil burner controls and a number of indicating and recording instruments is installed in the boiler room. It has boiler meters, CO_2 recorders, draft gages, steam pressure gages, water pressure gages, feedwater temperature gage, oil pressure gages and thermometers, main draft gages and two smoke density indicating and recording instruments. The latter are connected to a photoelectric cell installed in the uptake of each boiler, so that at all times any smoke produced by any of the boilers is both indicated and recorded on the boiler panel. This equipment was provided to assure that no objectionable smoke would be produced by the boiler plant, which is located on the fringe of one of Toronto's fine residential districts.

800 Tons of Refrigeration

The chilled water circulated through the two air washers on the 12th floor, through the cooling coils of the two central air conditioning units in the sub-basement, and through a heat exchanger which serves to finally chill the cooling water supply to all the radiant cooling panels, is cooled by means of a single 800 ton centrifugal refrigerating unit. This machine has the capacity to cool approximately 2000 gpm of water from 51.9 F to 43 F when supplied with 2000 gpm of condenser water at 85 F. The unit is driven by a wound rotor motor, with a starter and controller to give a motor speed reduction of 25 percent. The induced draft, spray filled cooling tower on the roof of the service building cools the condenser water for the centrifugal refrigerating unit. Both the chilled water pump and the condenser water pumps are installed at one end of the refrigerating unit.

There are separate refrigerating machines for the walk-in boxes in the kitchen, for the kitchen refrigeration, for the drinking water cooling installation and for cooling the garbage room. There is also an automatic ice maker in the kitchen.

There are three hot water storage heaters, each having a storage capacity of 500 U.S. gal and a heater capacity of 300 U.S. gal per hr, in the sub-basement. One provides all the domestic hot water required for the three lower floors of the building, as well as for the basement and sub-basement. The second heats all the hot water required in the kitchen, laundry and cafeteria. The third is a standby for both of the others. In the same way, two hot water storage heaters are installed in the equipment room on the 12th floor, one to provide all the domestic hot water required on the nine upper floors of the building and the other to act as a standby. The latter two storage heaters each have a storage capacity of 400 U.S. gal and a heater capacity of 200 U.S. gal per hr. Circulating pumps are installed on the various domestic hot water systems.

Automatic sprinklers are installed in the entire sub-basement and in the storage rooms in the basement. This is a wet pipe system having an alarm check valve wired to the electric protection system. A standpipe and hose system is installed in the remainder of the building. There are five standpipes in the building, each with fire hose in a recessed cabinet on each floor. Each hose cabinet is provided with 75 ft of $1\frac{1}{2}$ in. hose, a $2\frac{1}{2}$ gal soda acid fire extinguisher and a $2\frac{1}{2}$ in. valve for the fire department as well as the valve for the $1\frac{1}{2}$ in. hose.

Starting, Stopping Motors

It is not intended to go into the features of the electric installation here, except to mention one or two details which have a bearing on the heating and air conditioning systems.

The building is supplied with electricity by the Toronto Hydro-Electric Commission at 120/208 volts, three phase, 60 cycles. The lighting and all of the fractional horsepower motors are connected to 120 volt single phase circuits while the large motors are all connected to 208 volt, three phase circuits.

The electric power is brought into the property to the service building where the metering is done and the main switchboard located. From the main switchboard the electricity is distributed through the tunnel to distribution boards in the main building. One of these is in the sub-basement. It contains four circuit breakers for the lighting distribution system, with space for two future breakers, and a section which is equipped with pushbuttons and indicating lights, each connected to a different motor in the building. All motor starters are provided with "start" and "stop" pushbuttons. The pushbuttons on the sub-basement distribution board are all "stop" buttons only. Consequently, all motors must be started at their respective locations but may be stopped either at their starters or at the sub-basement distribution board. When a motor is running, the indicator light on the distribution board so indicates it by being on. Thus, the operator stationed in the sub-basement can see which motors are on and can shut down all the motors not required at night both quickly and conveniently as soon as the building is closed.

THE INTERIOR of the cafeteria is shown here. The finished ceiling includes the luminaires and the diffusers for delivering the conditioned air into the room

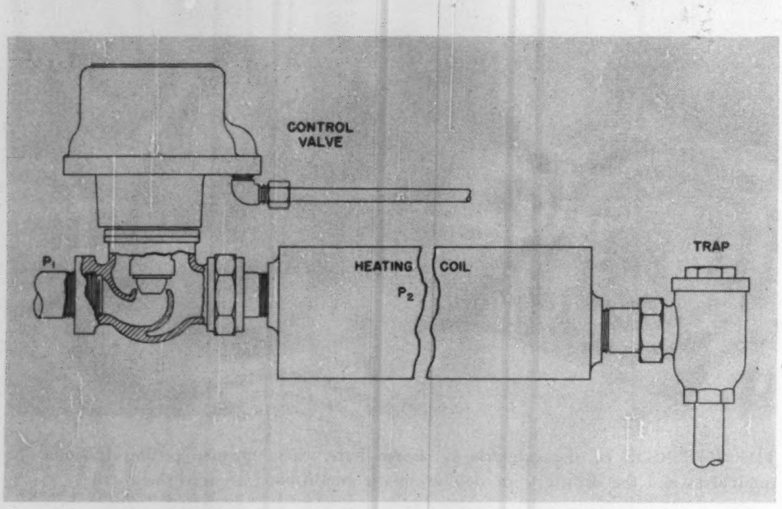
To Make Tests

The building is equipped with a rather complete set of test equipment. A large number of thermocouples were both built into the structure and fastened to different parts of the radiant heating and cooling installation and in the conditioned air ducts so as to test the operation of the system when controlled in different ways and to thus determine the best method of operation and control. In this way only can the fullest advantage be taken of all the characteristics of radiant heating and cooling, the water cooled luminaires, the thermal storage in the stucture and so forth. It is expected that at some future time an interesting paper on the results of these tests may be presented in another article in Heating, Piping & Air Conditioning.

The general contractor was Anglin Norcross Ontario Ltd. Price Air Conditioning Ltd. was the ventilation and air conditioning contractor, and the Canadian Comstock Co. Ltd. was the contractor for the radiant heating and cooling, the boiler plant, the fire protection, the electrical system, and the plumbing installations.

Controlling Unit Ventilators for Steam Systems

By Harold W. Alyea
Chief Field Engineer
Johnson Service Co.



1 CORRECT SIZING of the automatic control valve is of utmost importance. The best control system cannot compensate for incorrect valve sizing

Careful sizing of the automatic temperature control valve is important — as are other factors — to insure proper control of unit ventilators. This fourth and last article of a group presents certain recommendations for obtaining the desired results from unit ventilators when steam is used.

PROPER OPERATION of any unit ventilator requires not only a good control system but the correct application of the controls. Much of the control is accomplished by modulation of the unit coil valve, as discussed in this series of articles in the October and November, 1953 issues of HPAC. Therefore, it is important that careful consideration be given to the selection of the valve and to those factors pertaining to its proper operation.

Sizing the Valve

Correct sizing of the control valve is of utmost importance. A valve that is too large will produce unstable control which causes cyclic variations in the discharge temperature and results in complaints of drafts. No control system, however good, can compensate for incorrect valve sizing.

The general principles involved apply to the selection of a modulating steam valve used on any heating coil, but here the selection and sizing has been directed specifically to unit ventilator valves on low pressure steam systems.

There are three important factors which must be given consideration in arriving at the correct steam valve size for any unit. They are

1 The maximum amount of heat which the coil will be required to provide,
2 The steam pressure supplied to the valve, and
3 The pressure drop across the valve.

A discussion of each of these factors may help to clarify the problem and explain the recommended practice for valve sizing.

Selecting the Coil

The size of the unit coil is based on the heat loss of the space served, plus the heat required to warm the required quantity of outdoor air up to room temperature. The internal heat gain of the room from pupils, lights and sun is generally neglected in selecting the coil size, because at certain times the unit must maintain the desired room temperature when such uncontrolled heat gains do not exist. The heating capacity of any auxiliary radiators or convectors also is neglected, since it is not used during normal operation. This auxiliary heat source is for the purpose of aiding in rapid morning warm-up, or to augment the unit ventilator output at night when it is operating without the fans. Hence it cannot be considered in selecting the proper size of the unit.

Wherever possible, the valve capacity should be based on the actual heat requirements of the room, rather than on the condensing rate of the coil. Heat loss calculations are oftentimes conservative, and as a result the coil specified for a given room tends to be oversized. Also, the unit manufacturers cannot offer an unlimited number of coil sizes and generally the next larger coil size is selected instead of the smaller, which adds to the oversizing. Thus, it is apparent that basing the control valve capacity on the condensing capacity of the unit ventilator coil will often result in an oversized valve.

Use Average Steam Pressure

The capacity of the valve is dependent upon the pressure of the steam supplied to it. This pressure should be constant at all times. However, in most unit ventilator installations, the boiler is controlled by a pressurestat so arranged that the boiler will start delivering steam when the pressure is about 2 psig and stop it at about 5 psig. Hence, the pressure supplied to the valve is not constant but is continually varying.

When sizing the steam valve, it is suggested that the average steam supply pressure be used. The valve capacity is directly affected by the supply pressure since the density of the steam increases with the pressure. At 5 psig inlet pressure, a given valve will pass about 7.5 percent more steam in lb per hr than at 2 psig inlet pressure — using the same pressure drop. However, the supply pressure influences the pressure drop that is selected in sizing the valve. This pressure drop is far more important than the direct effect of the steam supply pressure itself. Therefore, it is recommended that the average steam supply pressure be used.

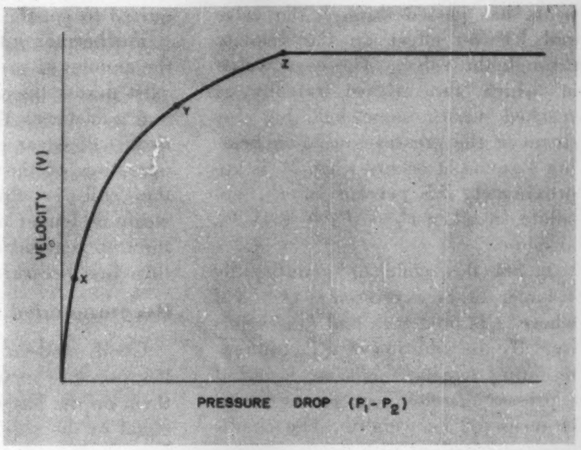
Selecting the Pressure Drop

The most important single factor in determining the correct valve size is the pressure drop across the valve in its wide open position — when it must supply sufficient steam to satisfy the maximum heating requirements. This pressure drop, for a given inlet pressure and capacity, determines the valve size. Obviously, more than one valve size can be selected, depending upon the pressure drop used.

For example, with one type of valve at an inlet pressure of 5 psig, a capacity of 115 lb per hr can be obtained with a 1-¼ in. valve having a 0.6 psig pressure drop, a 1 in. valve having a 1-½ psig pressure drop and a ¾ in. valve having a 5 psig pressure drop. Which would be the correct size to use? This can best be answered by considering the valve and coil combination in a steam system and how they function.

How Valve and Coil Function

For instance, assume that the quantity of air passing through the coil, its entering temperature, and the steam supply pressure are all constant. The condensing capacity of this coil, under these conditions, is sufficient to meet the maximum heating demand of 115 lb per hr, and therefore the coil is oversized at all demands lower than this.



2 THE RELATIONSHIP between pressure drop and velocity through a valve holds the key to correct valve sizing

Referring to Fig. 1, P_1 is the steam supply pressure, P_2 the pressure in the coil, and $P_1 - P_2$ is the pressure drop across the valve. The valve is located close to the coil and, for all practical purposes, the pressure drop between the valve and the coil can be neglected.

The purpose of the control valve is to create a resistance to steam flow and thus to regulate the amount of steam flowing. With the supply pressure P_1 constant at 5 psig (19.7 psia), and using the 1 in. valve mentioned previously, the pressure drop across the valve when wide open, $P_1 - P_2$, is 1-½ psig for a steam flow of 115 lb per hr. The valve permits the exact amount of steam to enter the coil that can be condensed. As a result, a steady state of flow exists, and P_2, the pressure in the coil, is 3-½ psig, or 18.2 psia.

If the valve is closed part way, it momentarily passes less steam. The coil, still condensing 115 lb per hr, causes P_2 to drop. $P_1 - P_2$ thus increases, which in turn increases the valve capacity until a balance between valve capacity and coil condensing rate again is established. Assume that the valve closes to 45 percent of its full open port area — which is exactly the same as the full open port area of a ¾ in. valve of the same make.

The coil pressure P_2 will drop until the valve capacity and coil capacity are in balance. In this case, the coil pressure P_2 will drop to 0 psig or 14.7 psia. $P_1 - P_2$ is 5 psig, and at that pressure drop the valve capacity is still 115 lb per hr — the same as the ¾ in. valve when wide open, since the port areas are the same. At the new coil pressure of 0 psig, the coil capacity is about 5 percent less than it was at 3-½ psig. It is apparent then, that closing the 1 in. valve to 45 percent of its full open port area has accomplished nothing but a 5 percent reduction in coil capacity and an increase in velocity through the valve port.

The relationship between port area and valve stroke in most automatic throttling valves is not linear but varies with the shape of the throttling plug, the V-port skirt or similar inner valve member, to obtain the valve characteristic desired. Hence, closing a valve to 45 percent of its full open port area does not mean that this requires 55 percent of the full valve stroke. For the 1 in. valve under the conditions mentioned, whatever portion of the stroke is used in closing the valve 55 percent is practically useless in providing control of the steam flow.

Velocity Is Important

The relationship between pressure drop and velocity through a valve holds the key to correct valve sizing, and this relationship can be represented by the curve shown in Fig. 2.

At low values of pressure drop, the velocity is low, but a small increase in pressure drop creates a large increase in velocity. The velocity increases at a decreasing rate until point "Z" is reached where a further increase in pressure drop produces no further increase in velocity. This point is known as the critical pressure drop, and the velocity at this point is called the critical velocity. Any pressure drop greater than this critical value takes place after the steam has passed through the valve and has no effect on the velocity through the valve. The exact value at which the critical velocity is reached varies somewhat, but for steam at the pressures used in heating systems, it occurs when P_2 is approximately 55 percent of P_1, absolute, or when $P_1 - P_2 = 0.45\ P_1$, absolute.

Steam flow rate or quantity by volume, can be expressed as $Q = VA$ where A is port area and V is velocity. By the addition of a factor representing density, this same equation expresses the flow rate of the steam in terms of its weight. The conditions experienced with the 1 in. valve when wide open can be represented by point "X" in Fig. 2, and when it is 45 percent open by point "Y". Between points "X" and "Y" the curve is steep, which represents a rapid rate of velocity increase. However, the product of the velocity times the area — with a correction for density — remains relatively constant. Beyond point "Y" the velocity increase is relatively small, a reduction in quantity starts to take place, and the valve begins to provide effective control.

An oversized valve, or one with too low a pressure drop when wide open, cannot begin to control until it has closed an appreciable amount. By then, the velocity and pressure drop have become high enough so that as the pressure drop increases further, the rate of velocity increase is relatively low, and the valve begins to exert effective control.

It would always be desirable to select the valve size so that the pressure drop, when the valve is wide open, is equal to the critical value — point "Z" in Fig. 2. Thus, the pressure drop and velocity through the valve would not increase at all as the valve closes, and the quantity would be approximately proportional to the valve port area. However, it is not always possible to select such a large pressure drop on low pressure steam installations because of its effect on the maximum coil capacity.

Taking the example used previously with the supply pressure P_1 at 19.7 psia, P_2 would be 55 percent of 19.7 or 10.8 psia at the critical velocity. This would be about −4 psig, and at that coil pressure the maximum coil capacity probably would be reduced too much. A larger coil may be required to get the necessary capacity.

Furthermore, there is a limit to the amount of pressure drop that will exist across the valve as it throttles, and sometimes the critical pressure drop will never exist because of the operation of the steam trap. After the coil is throttled sufficiently, steam no longer reaches the trap, and the trap remains open. Thus, the return line pressure exists in the coil.

Recommended Pressure Drop

Good modern practice in sizing low pressure steam valves is to select them on the basis of a pressure drop equal to the supply pressure (gage) for supply pressures up to about 10 psig. Above 10 psig, the critical value can be used. Thus, for supply pressures up to 10 psig, the coil pressure P_2 would be 0 psig when the valve is wide open. For 15 psig supply pressure, P_2 would be $0.55 \times (15 + 14.7) = 16.33$ psia, or about 1.6 psig. The drop through the valve would be 15−1.6 or 13.4 psig.

It is not absolutely necessary that these specific pressure drops be used to obtain good control. There may be other reasons, in some cases, why it would be inadvisable to base the valve size on such large pressure drops, and lower pressure drops may be used. This is particularly true if the valve is located some distance from the coil so that there is an appreciable pressure drop between the valve and coil. It is important, however, to use a pressure drop high enough to eliminate the condition represented by the steep portion of the curve in Fig. 2 so that operation is in the range of small velocity changes.

Having determined the required valve capacity, the steam supply pressure, and the correct pressure drop across the valve, the proper valve size is selected by referring to the valve manufacturers' capacity tables. Of course all valves of a given nominal pipe size do not have the same capacity. Variations in port sizes and inner valve construction and even different valve types of one manufacturer, make it necessary to use the capacity table that applies to the particular make and type of valve under consideration.

To answer the original question, the 1-¼ in. valve obviously is out of the question. It was shown that the 1 in. valve would not control the flow of steam until closed to about 45 percent of its wide open port area, and at this point it is equivalent to a wide open ¾ in. valve. The ¾ in. valve is the one to select, and by so doing the ineffective portion of the 1 in. valve range is simply eliminated.

Drop Affects Coil Capacity

In selecting a heating coil, the tendency is to base its size on the specified steam supply pressure. This can lead to trouble, especially at the higher supply pressures, if the control valve selection is based on a sizable pressure drop. The coil capacity should be based on the actual average pressure that will exist in the coil when the valve is wide open, which is the supply pressure minus the pressure drop through the valve.

On low pressure applications this is not too important. The difference in coil capacity at 2 psig and 0 psig is only about 3 percent. Coils usually are oversized by more than this amount anyway. At higher steam pressures, it becomes necessary to make an allowance for the pressure drop through the valve. On a system with 15 psig steam supply, if the pressure drop through the valve is 10 psi, the coil size should be based on 5 psig steam. The difference in coil capacity at 15 psi and at 5 psi is about 10 percent.

Supply Pipe Sizes

Questions have been raised about the practice of using a large pressure drop through the control valve, because of the time and expense involved in sizing the steam supply mains and runouts so as to provide a low pressure drop up to the control valve. The answer to this may be found in the entirely different functions of the supply pipes and the control valves.

The function of the supply piping is to convey steam from the point of generation to the various condensing units so that even distribution will result at a relatively uniform pressure throughout. Equitable distribution is obtained only if the pipe sizes are large enough. The reason for this is that the steam fills the supply pipes before attempting to enter the more restricted valve passages. In any heating system, the quantity of steam being conveyed by the piping system varies from zero at no heating load to maximum at full heating load. The pressure drop in the piping system varies with the quantity of steam flowing, and therefore if the piping is sized for a low pressure drop at maximum flow, the pressure drop varies the least as the quantity varies. For best control, all of the pressure drop in the system should occur in the control valve. This obviously is impossible, but by sizing the steam supply pipes as large as is economically feasible, the nearest practical approach to ideal conditions is realized.

In contrast to the function of the supply system, the function of the valve is to create a pressure drop, because it is only by this means that it can regulate the flow of steam. Furthermore, a large pressure drop through the control valve does not represent a loss of energy, since no work is being performed by the steam as its pressure is reduced. Latent heat is simply converted into sensible heat, and neglecting the conduction losses of the valve itself, the steam has the same heat content after it leaves the valve as it had upon entering. The steam quality will be improved, or its superheat increased.

Constant Steam Pressure

In discussing some of the problems encountered in providing stable control in the article in the November HPAC, mention was made of the practice of operating the boiler by pressure control — which allows the pressure supplied to the control valve to vary between the settings of the pressurestat. If the pressurestat is set to start the burner at 2 psig and to stop it at 5 psig, obviously the operation of the control valve will be affected. However, while the boiler is off, the steam pressure gradually decreases. This affects both the supply pressure to the valve and the pressure drop across the valve which in turn changes the valve capacity. The object of automatic control is to balance the valve capacity with the heating requirements and to maintain a constant temperature, but since the valve capacity is decreasing, the thermostat must gradually open the valve to maintain the heat balance.

When the steam pressure reaches 2 psig, the boiler starts to operate and the steam pressure begins to increase. This requires a reversal of the thermostat action to again gradually close the valve, until the pressure of 5 psig is reached. Then the burner stops and the cycle is repeated. Thus, the steam pressure in such a system is constantly changing, the control system is never permitted to stabilize, and the kind of results of which the control system is capable will not be realized.

Why a Reducing Valve?

The simple addition of a reducing valve to the system can help to correct the condition of varying steam pressure. Where a community is spending several hundred thousand dollars for a new and modern school building, it seems poor economy to sacrifice the best in temperature control because of the lack of an item which will add only a few dollars to the overall cost.

It is recommended that where boilers operate on pressure control, a pressure reducing valve be installed in the steam main. This not only aids the control system, but permits the use of a wider operating differential on the pressurestat. Thus, less frequent operation of the burner is required. The reducing valve can be set for a constant value of, say 2 psig, while the boiler pressure is maintained between 4 and 8 psig — or even higher.

If a reducing valve is not used, it is desirable from the control standpoint to operate the boiler with the minimum practical differential. A pressure range between 2-½ to 4-½ psig is much better than 2 to 5 psig. It is also an advantage to increase the boiler operating pressures somewhat. Varying the boiler pressure from 3 to 6 psig has a smaller percentage effect on the capacity of the control valves than varying the boiler pressure from 1 to 4 psig. The valves, of course, must be sized accordingly.

Return Line Vacuum

Another variable influencing the stability of control — and the capacity of the control valve — is the return line vacuum. Since the vacuum pump normally is controlled from a vacuum switch, its operation is intermittent and the vacuum varies within the switch differential limits. When the valve is throttling to any large extent, the return trap is open and the return line vacuum exists in the coil. Variations in coil pressure — due to operation of the vacuum pump — have as much effect on the differential across the valve and on the valve capacity, as do variations in the steam supply pressure. Good practice suggests that the switch differential setting be as narrow as possible — consistent with not too frequent operations of the pump.

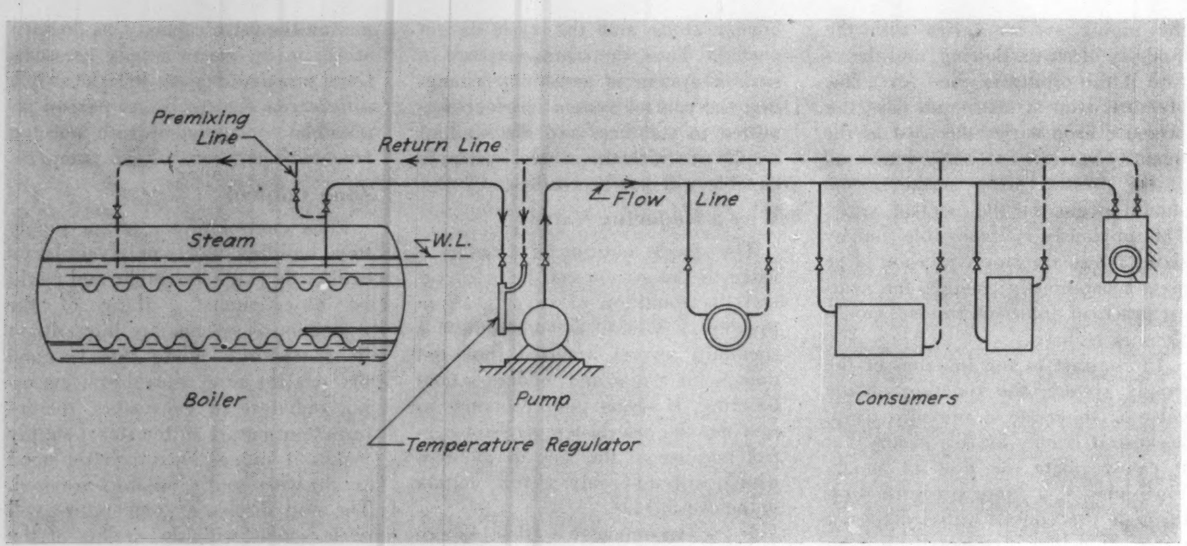
Zone Control

Zone control of the steam supply to a building using unit ventilators ordinarily is not desirable, and might be objectionable. Many of the zone control systems are intermittent in operation. While this is good practice for zone control systems using radiators or convectors, the intermittent nature of the steam supply makes it impossible to obtain good results when unit ventilators are used. The unit discharge temperature will cycle widely with the cycling of the zone valve and drafty conditions will probably result.

Most of the continuous flow zone control systems resort to intermittent operation at mild temperatures and, during this time, produce the same results as the intermittent systems. Since proper thermal conditions and the absence of drafts are the objectives of the control system, it would be far better to omit zone control and provide a good reducing valve for the steam supply system. This will assure that the control valve in each unit will receive a supply of steam at constant pressure and will enable the normal unit ventilator controls to perform as expected.

This group of articles on unit ventilators and their control makes no pretext of covering the subject completely. It is hoped that the points discussed will result in a better understanding of the problems involved and a better application of the controls to accomplish the results that are desired — in the best and most economical manner.

This is the fourth and last article of a group on the subject of controlling unit ventilators for school buildings. The first article in the October 1953 HPAC explained the fundamentals and temperature control cycles involved. The second article in the November HPAC discussed the new developments in unit ventilators and control methods as a result of the trend to build schools with large glass areas. The third article in the December 1953 HPAC described the control of unit ventilators on hot water systems.



1 HIGH TEMPERATURE hot water may be pressurized by steam generated in the same boiler. This shows the arrangement of the component parts of the system

High Temperature Hot Water

. . . is finding increasing process and space heating applications

By S. A. Kuli

Project Engineer
American District Steam Co., Inc.

HIGH TEMPERATURE hot water is water that has been heated above 212 F, the boiling temperature at sea level and at atmospheric pressure. In other words, high temperature hot water can be generated *under pressure* only.

The simplest and most commonly used method of pressurization is by steam, although there are other methods such as pressurization by an elevated tank, by an artificial head provided by a hydraulic pump, or by air or nitrogen contained in a vessel, as was described in an article by J. R. Kell in the February 1953 HPAC.

This article will deal with systems pressurized by steam only.

There are three methods of building up steam pressure, which are the following:

1) In a directly fired high pressure boiler, as shown in Fig. 1,

2) In a tubular heat exchanger using high pressure steam as the heating medium, and

3) In a direct contact heat exchanger (cascade heater), as shown in Fig. 2.

In all these cases, steam is maintained on top of a water level controlled by an automatic water level regulator. Steam — being compressible — serves as a cushion and takes the expansion of the water in the system. Thus, separate expansion vessels are not needed.

Closed Circuit

One of the features characteristic of high temperature hot water heating is its completely closed circuit. Water is heated in a boiler or heat exchanger, circulated by means of centrifugal pumps to the various heat consumers, and is returned to the boiler or heat exchanger to be reheated. Practically all of the heat not used by the consumers will be returned in the closed circuit — this is the source of fuel savings.

Temperature Control

High temperature hot water heating enables sensitive modulation control which assures uniform temperature and thus fuel savings result. The temperature of the water is regulated at a central station by means of a temperature mixing device — which is part of the regulator and is shown in Fig. 3. Automatic ratio controllers are also available.

Zone control can be provided with high temperature hot water heating, and Fig. 4 shows the basic hook-up of a separated central temperature control system for a 5-story building, 1000 ft long, in Germany. All of the rooms in the building have south and north exposures. Of course on sunny days, the south side rooms do not require as much heating as those on

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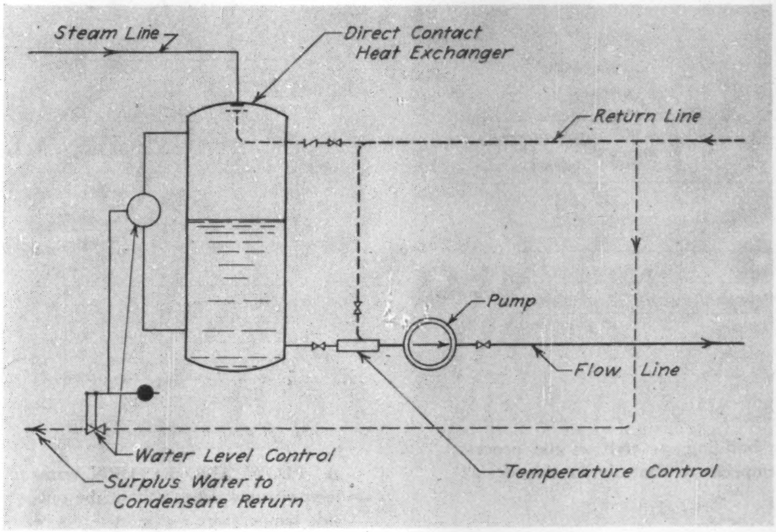
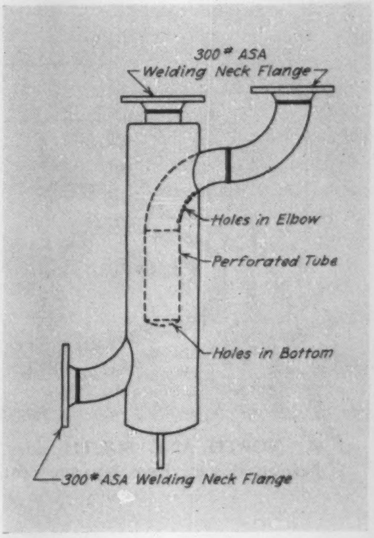
Mr. Kuli was active in the design and installation of many high temperature hot water heating systems in Germany after the last war — while an employee of the Caliqua Heating Co. there. Mr. Kuli came to the U. S. in 1951.



2 A DIRECT CONTACT heat exchanger may be used in generating high temperature hot water



3 A MIXING DEVICE that is part of the hand-operated temperature control is widely used in European installations

the north side. Therefore, two circulating pumps with two temperature regulators were installed in the boiler house. One flow line serves the south side and one the north side of the building, yet both sides have a common return. A connection between the two flow lines allows the use of one pump only during periods of equal heat demand for both sides.

The process heating equipment requires different and steady temperatures, so these lines have a different temperature control.

Selecting the Pump

Circulating pumps are selected to meet the special conditions of high temperature hot water heating. The first requirement is that they be constructed for high operating pressure and continuous service. All parts subjected to wear are of high quality metal. Low velocity of water and longer pump life are achieved when moderate speeds are selected. Low net positive suction head helps to eliminate the vacuum caused by flashing and hammering in the suction line.

The material from which the pump casing is fabricated depends upon the operating pressure and temperature. For temperatures not higher than 350 F, cast iron is usually satisfactory. Above this temperature, cast steel is used.

Circulating pumps for high temperature hot water service that have been used in Europe possess certain features that are of interest. The stuffing box chamber and bearing housing are water cooled. Cooling water first enters the inlet tapping of the ball bearing housing, then enters the stuffing box chamber after which it leaves the pump at the top through a ½ in. pipe. It is good practice to protect the pump against failure of cooling water by means of a safety interlock switch. This switch is connected to a simple mechanism that is placed between the open cool water discharge line and the outlet funnel. The flowing water pushes the linkage of the mechanism down and thus the switch makes the connection of the pump motor. However, when there is no flow, a counterweight will raise the linkage and the switch will disconnect the motor.

A protection for the pump against vacuum-caused flashing in the high temperature hot water suction line is the "premixing line" referred to in Fig. 1. This is simply the steady injection of a certain amount of cooler return water into the main suction line, as near to the boiler drum as possible.

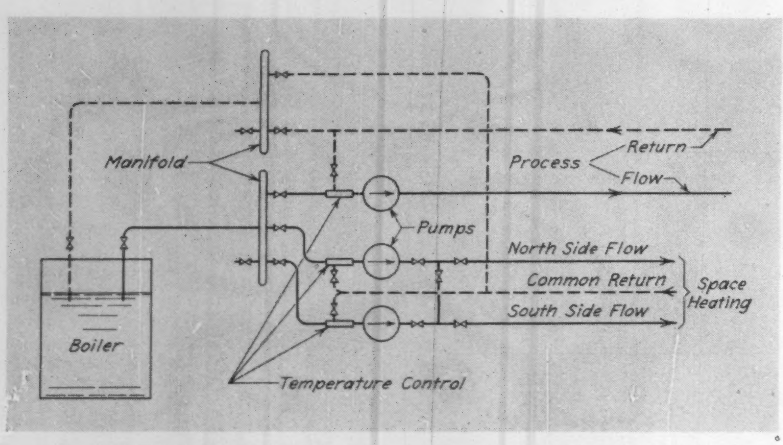
Pump failure does not affect operation of a natural circulation boiler. Therefore, protective measures are generally unnecessary. Forced circulation boilers, however, should be protected against pump failure by a safety interlock, which shuts off the boiler firing in the event of pump stoppage.

Low Water Level Protection

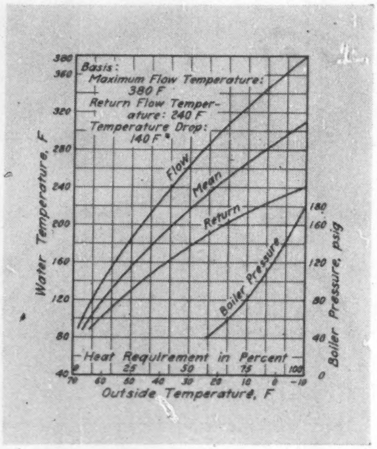
Automatically fired boilers, as a rule, have a low water cut-off arrangement which stops the boiler fire as soon as the water level falls below a predetermined line. Thus, the boiler tubes are protected against burning out.

Hand fired boilers are usually equipped with an alarm signal — such as a bell or a light — which indicates that the water level is low. Thus, the fire can be extinguished before the boiler tubes are burned. These protective devices are the same type that are usually applied to steam heating systems.

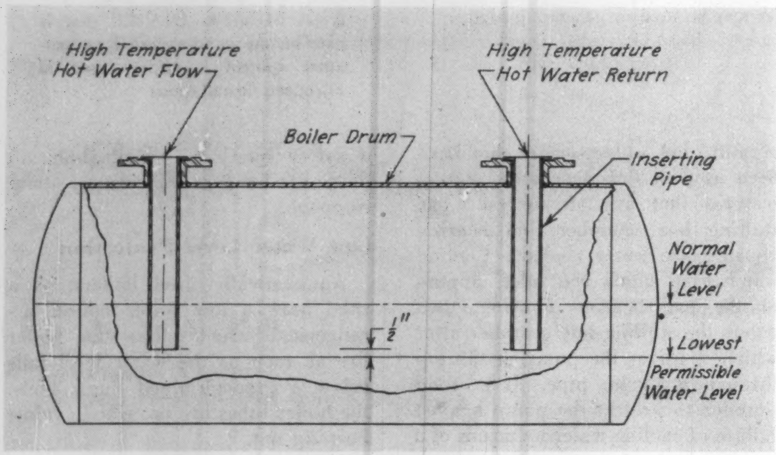
An additional protection against low water level is sometimes used, as shown in the arrangement of flow and return connections in Fig. 5. The method of connecting the flow and return lines to the boiler is different from that used in low pressure hot water systems. Here, both flow and return lines are connected to the boiler drum so that the insert pipes are just ½ in. above lowest permissible water level. If, for any reason, the water level would fall below this limit, steam would enter the flow or return lines and water circulation would be broken — but water would stay in the boiler. Thus, burning out



4 NORTH AND SOUTH sides of a building, as well as the process heating system, have separate central temperature controls in this design



6 FLOW AND RETURN water temperatures depend upon the outside temperature — or in terms of the heating requirements


High Temperature Hot Water Flow
High Temperature Hot Water Return
Boiler Drum
Inserting Pipe
Normal Water Level
1/2"
Lowest Permissible Water Level

5 AN ADDITIONAL PROTECTION against low water level is sometimes used that has the flow and return connections on the drum of a watertube boiler made like this. Other openings on boiler drum are not shown

of the tubes would be avoided. This protection is especially important and is widely used in Europe for handfired boilers.

Pressures Encountered

Excessively high boiler pressures are not necessary for high temperature hot water systems. There is an economical limit for this temperature which is about 400 F. In Europe, most systems are using boilers with 100 to 150 lb pressure and operate at 300 to 350 F maximum water temperatures. For this reason, commercial steam boilers can be used very advantageously.

Because temperature is a function of pressure in high temperature water systems, the pressure can be determined by the temperature requirements, as shown in Fig. 6. There are two methods of adjusting firing rate to plant heating requirements.

1) Boiler pressure can be changed according to temperature demand, or

2) Boiler pressure is kept steady, and the temperature changed by mixing return water with the supply in accordance with temperature requirements.

In Europe, the second method is usually followed for two reasons.

a) Most plants need a steady higher temperature for process heating, and

b) Firing is more economical when the boiler pressure is steady.

A minimum pressure of approximately 30 psig must be maintained in most plants to overcome the static water pressure of the system. Higher minimum pressures are required when the boiler is lower and high buildings are to be served.

Heat Storage Capacity

The high temperature hot water heating system has an important advantage of high heat storage capacity. Heat consumption varies in most plants throughout the day. Generally, a few hours of high peak load are followed by hours of very low heat demand. This is also true for space heating where the peak is especially high in the morning and low during the midday hours. Also, for process applications where "heating-up" periods often require 10 to 20 times as much heat as periods of actual production, this consumption varies greatly.

In this type of system, the large volume of water acts as a moderator between the heat demand on the boiler and the actual heat load. Therefore, pressure in the system remains practically constant — this results in better boiler efficiency.

The heat storage capacity of the system alone generally equalizes the fluctuation of heat demands. However, there are cases where the installation of an accumulator is required, especially where power peak and heat peaks coincide, and exhaust or bleeding steam is used for generating high temperature hot water in a heat exchanger. This is also of importance when boilers are not fired during the night, and peak load of the system is rather high in the morning.

In all these cases, a high temperature hot water accumulator is simpler and more effective than a steam type, because the latter operates at varying pressures. Moreover, storage tanks for high temperature hot water are small because of the water's high specific heat.

Accumulator Selected

In a city in Germany, two competitive firms were bidding for a contract to heat a large office building which needed heat during the day shift only. The building was to be heated by high temperature hot water with a maximum temperature of 250 F, and cast iron radiators were used. The boilers — located about a half mile from the new building — were fully loaded and could not take any new load.

One of the firms suggested that a new boiler be erected in a small boiler house as a part of the new building. This suggestion coincided with the management's plan. The other firm learned that the heat load of the plant was rather low during the night shift. For that reason, it suggested that a high temperature hot water accumulator be erected for the new building. The accumulator was to be heated during the night shift and the heat drawn from it during the office hours.

Naturally, the latter proposition was more economical in spite of the fact that a rather long distribution line was to be installed from the boiler house to the new building. The order was given to the firm offering the accumulator and the system has been working satisfactorily ever since.

[This article is one of a group on the subject of high temperature hot water heating. Applications of this type of system will be presented in future articles.]

Piping Code Committee Rules on Pipe Threads, Materials

FROM TIME TO TIME, certain actions of the sectional committee B31 on the American Standards Association Code for Pressure Piping, sponsored by the American Society of Mechanical Engineers, are issued for the information of interested parties. While these do not constitute formal revision of the code, they may be utilized in specifications, or otherwise, as representing the considered opinion of the committee.

Pending revision of the Code for Pressure Piping, ASA B31.1-1951, the sectional committee has recommended that selected interpretations be published so that industry may take immediate advantage of corresponding proposed revisions.

The following information is published by special permission of the American Society of Mechanical Engineers, 29 W. 39th St., New York 18, N. Y. Case 13 appeared in the November 1953 HPAC. Cases 10, 11 and 12 appeared in the September 1952 HPAC. Case 5 was annulled and Case 7 was corrected in the April 1952 HPAC. Cases 6, 7, 8 and 9 appeared in the October 1951 HPAC, and Case 5 was in the August 1951 HPAC. Cases 1 to 4, issued prior to the latest revision of the code, have been annulled. Case No. 12 (re-opened) and Case No. 14 are published herewith as interim actions of sectional committee B31 on the Code for Pressure Piping that will not constitute a part of the code until formal action has been taken by the ASME and by the American Standards Association on a revision of the code.

Case No. 12 (Re-opened)

Inquiry: Is it permissible to use material conforming to the ASTM emergency alternate provisions for phosphorus and molybdenum, viz. ASTM EA-335?

Reply: It is the opinion of the committee that material may be used in accordance with the emergency alternate provisions with no change in allowable stresses.

Case No. 14

Inquiry: May straight threaded couplings be used with schedule 40 or standard weight threaded pipe in sizes 2 in. and smaller?

Reply: It is the opinion of the committee that straight threaded couplings may be used with schedule 40 or standard weight pipe in sizes of 2 in. and smaller provided that the fluid pressure does not exceed 150 psig and the temperature does not exceed 500 F for piping conveying non-noxious fluids. This applies to sections 1, 3, 4 and 5 of the code, but not to section 2.

Great London Smog Caused 4000 Deaths

DURING THE GREAT London smog of December 1952, which resulted in the deaths of at least 4000 people, the concentration of sulfur gases and of smoke reached up to 10 times their normal levels. The story of this tragedy was told by Dr. E. T. Wilkins, officer in charge of atmospheric pollution research of the British Department of Scientific and Industrial Research, before the air pollution control symposium at the annual meeting of the American Society of Mechanical Engineers.

The smog affected persons of all ages but particularly children, and adults over 45 years of age; the increased deaths were mainly ascribed to bronchitis and pneumonia, which increased eight times and three times, respectively.

There was less than one day's time lag between the arrival of the smog and the commencement of the increased mortality, Dr. Wilkins pointed out. In the Meuse Valley (Belgium) and Donora (Pa.) smogs, two or three days elapsed before the first deaths occurred. The London death rate did not return to normal until three weeks after the smog.

Reports Record-Breaking Air Conditioning Sales

"RECORD-BREAKING" sales of air conditioning equipment in the 2 to 25-ton range have been reported by Servel, Inc.

The company's sales volume on all-year air conditioners and heavy duty water chillers was already 101.2 percent ahead of 1952 figures in November, when the report was made, according to John A. Gilbreath, assistant vice president in charge of air conditioning.

"We expected 1953 to be a good year," Mr. Gilbreath said, "and it fulfilled our expectations."

THE NEW BUILDING contains the central steam and refrigeration plants from which steam and chilled water are circulated through a tunnel under the street to the old building

Turbine Driven Compressors

. . . furnish refrigeration for air conditioning Harris County court house in Houston

By I. A. Naman and Jack B. Buckley

Office of I. A. Naman, Consulting Engineer

The new Harris County court house and jail building project in Houston consists of two buildings. One was completed at the turn of the century, and the other was recently erected across the street from it. The new building contains the central steam and refrigeration plants from which steam and chilled water are circulated through a tunnel under the street to the old building.

The new building contains the jail, laundry, sheriff's department, courts, judges' chambers, jury dormitories, cafeteria, offices and large public spaces. The old building — in the process of being completely renovated — will contain civil courts, judges' chambers, jury dormitories and offices.

In general, the air conditioning system serves all occupied areas — except the jail — and consists of central station type air conditioning units with duct work. All the air conditioning units are supplied with steam and chilled water, except those serving certain areas, such as the jury dormitories, sheriff's department, and special meeting rooms that are used at night and on other occasions when the central refrigeration plant is not normally in operation. These special areas are served by individual direct expansion systems.

Refrigeration Capacity Upped

The central refrigeration plant consists of two steam turbine driven centrifugal compressors using "Freon-114" refrigerant. The plant was not originally designed for this refrigerant, but because of a combination of circumstances it became advantageous to use it. The original contract was based upon a total compressor capacity of 1140 tons of refrigeration using "Freon-11." While the new building was under construction, the county amended the contract and increased the building from six to eight stories in height. At the time of this change, the compressors had already been manufactured and shipped to the contractor. It was possible to increase the capacity of these two machines from the original 1140 tons to the new required total capacity of 1450 tons by changing the refrigerant to "Freon-114." There was such a saving in obtaining the additional capacity in this manner, as compared with purchasing entirely new equipment, that this was the most economical solution to the problem — even after taking into account the lower efficiency and greater operating cost of the "Freon-114" modified system.

Turbines Drive Compressors

The steam turbines driving the compressors are direct connected and operate on 235 psig, 100 F superheated steam at 26.0 in. HG vacuum.

The steam is generated by three 150 bhp water tube boilers. They are operated at a total capacity of 1125 boiler horsepower at a pressure of 235 psig and a temperature of approximately 500 F. To the main steam header are connected various branches with pressure reducing and desuperheating stations to provide the following services:

1) 100 psig steam for laundry.
2) 25 psig steam for building heating and hot water generators.
3) 5 psig steam for the snuffers in the kitchen exhaust hoods.

In the original consideration of the various types of drives that might be used for the centrifugal compressors, a careful analysis was made of first cost and maintenance and operating expenses. It was found that the first cost using turbines was somewhat higher, but that the reduction in operating cost would permit the investment to be paid off in a relatively short period of time. In addition, the steam turbine drive has numerous advantages in ease of automatic operation.

Condensate is returned from the steam surface condensers serving the compressors, from the building heating system, and from the domestic hot water heating system to a condensate receiver. The condensate is pumped from the receiver into the deaerating feedwater heater as required and is then pumped into the boilers by a steam turbine driven boiler feed pump. The turbine driving the pump is operated non-condensing and discharges at 5 psig into the deaerating feedwater heater.

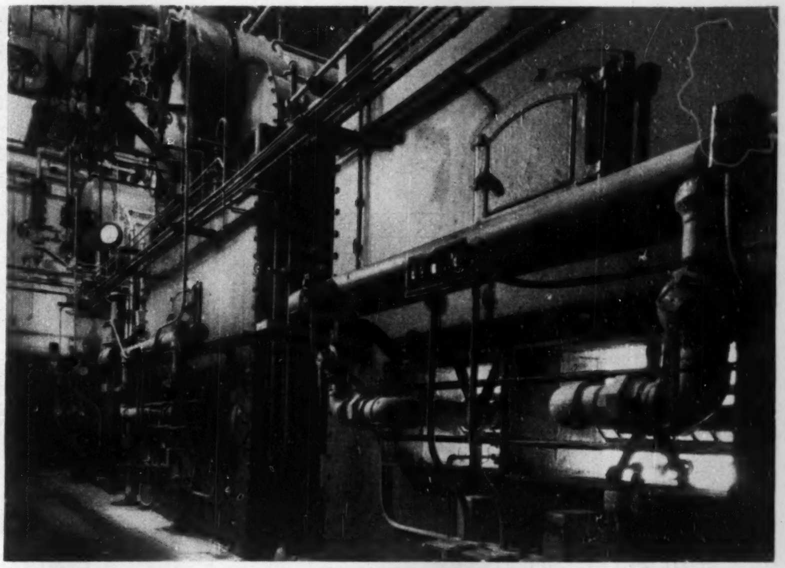
50 Central Station Units

The air conditioning system for the new building consists of approximately 50 central station type units which are provided with a chilled water cooling coil and a steam coil for heating or reheat. Outdoor air is handled by three large air washers, handling 60,000 cfm, which provide treated outdoor air to each of the air conditioning units. There is a bypass damper around the cooling coil only in the typical air handling units, but not around the heating coil. The treated outdoor air at a constant temperature of 58.0 F dry bulb and 57.5 F wet bulb is introduced between the heating and cooling coils. During part of the season, this treated outdoor air will satisfy the cooling requirements for some interior zones.

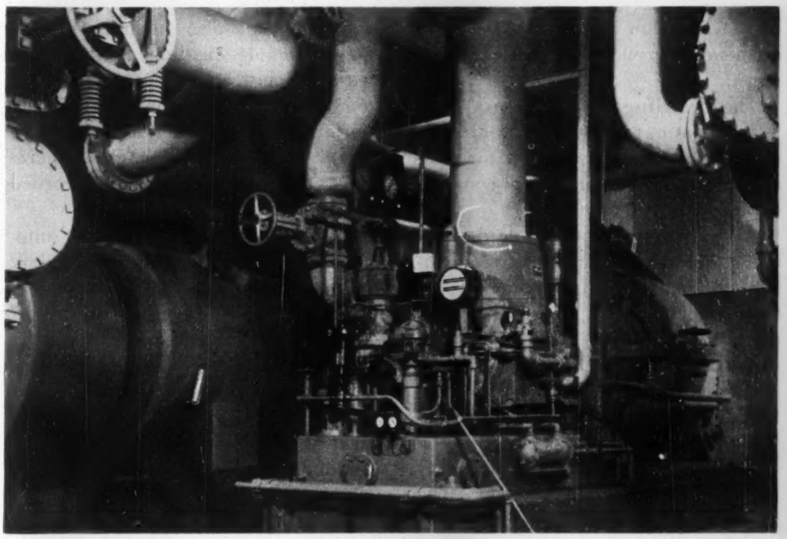
Completely Automatic

Each air handling unit is provided with pneumatic temperature controls which operate the face and bypass dampers, and a modulating steam valve on the heating coil. A thermostat and humidity controller are provided to maintain a constant room dry bulb temperature and upper limit for the room relative humidity. The arrangement of the air handling units with the bypass for the cooling coil only permits a very simple sequence operation in changing from the cooling to the heating cycle so that the system is completely automatic. No change-over is required in the control system in going from cooling to heating. No humidification is provided, since it is seldom needed in Houston.

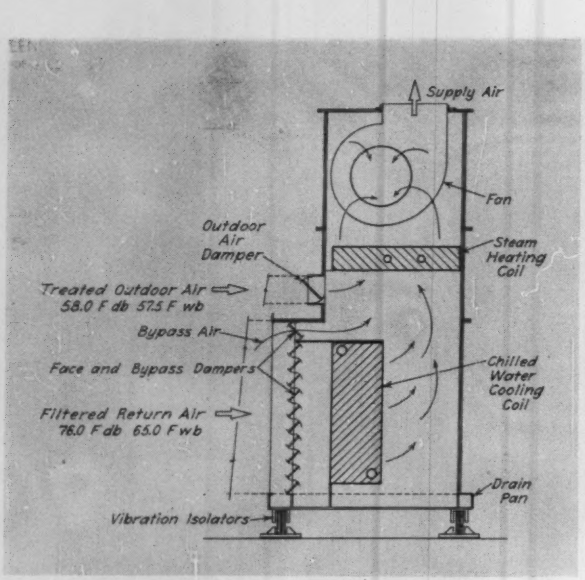
The boilers have an automatic combustion control system which automatically maintains the required boiler capacity at all times. Record-



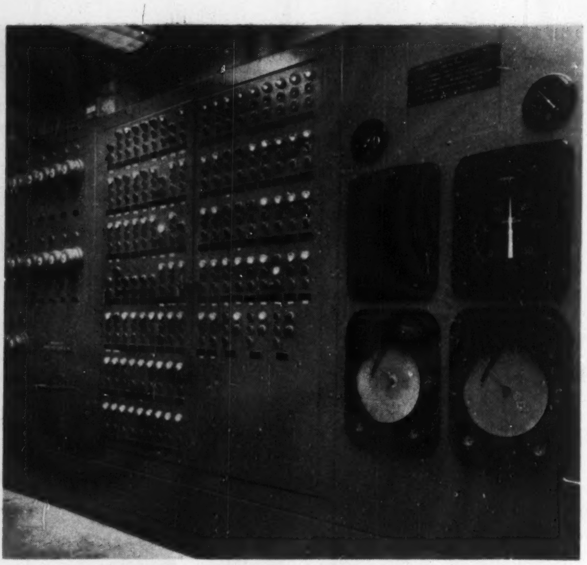
STEAM IS GENERATED by three water tube boilers operating at 235 psig and about 500 F. Branches from the main header supply steam for the laundry, building heating and hot water, and snuffers in the kitchen exhaust hoods



TWO STEAM TURBINE DRIVEN centrifugal refrigeration compressors provide a total capacity of 1450 tons for air conditioning



SOME 50 CENTRAL STATION units provide air conditioning in the new building. This sketch shows a typical air handling unit



A CENTRAL PANEL in the equipment room enables control of all air conditioning equipment throughout the building

ing steam flow meters permit the efficiency of operation to be determined.

The centrifugal compressors have a pneumatic temperature controller which varies the speed of the turbines as required to maintain a constant chilled water temperature.

All air conditioning equipment throughout the building may be controlled from a central panel in the equipment room. Bells alert the operating engineer in case of any important failure in operation. There is a single master switch on the control panel for emergency use, so that every part of the air conditioning system throughout the building may be stopped in case of fire. The control panel also contains an 80 point, remote reading thermometer with which the engineer can check temperatures of air or water at important points throughout the installation. The chilled water temperature from each chiller is recorded on a chart.

It has been found that the automatic operation of the entire plant is a great advantage. It is possible for one man to operate the entire air conditioning system from the control panel, with occasional observations of the equipment in the boiler room. The ability of the system to either heat or cool as required without any manual switch-over is especially important in Houston, since the change normally is required at least twice a day for many days during the fall, winter and spring.

Keeping Noise Down

The matter of maintaining low noise level from the air conditioning equipment is of extreme importance — especially in certain areas, such as the court rooms. All moving equipment throughout the building is mounted on spring vibration isolators and all equipment rooms were especially treated to minimize sound transmission into the building. Concrete floor slabs were especially constructed in the equipment rooms, acoustical treatment was provided on the walls and special acoustical doors were used.

In order to reduce the transmission of noise through the duct work, each air handling unit is provided with sound traps on the supply and return sides. These sound traps are of the multiple plate type, using a rigid acoustical board.

The result of all of the precautions taken with regard to sound and vibration control has been found to be very satisfactory and is considered to be important by the occupants of the building.

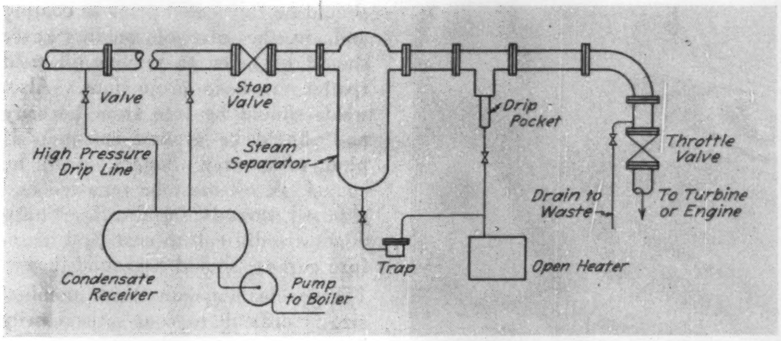
The architects are Finger and Rustay, I. A. Naman is the consulting engineer, and Charles G. Heyne & Co. is the air conditioning and piping contractor.

"Most Air Conditioned City"

HOUSTON — according to the magazine "Houston," published by the city's chamber of commerce — is the nation's "most thoroughly air conditioned city," on a per capita basis. Air conditioning installations, in tons of refrigeration, for recent years total:

Installed prior to 1946	48,500
Installed in 1946	7,959
Installed in 1947	15,526.5
Installed in 1948	25,925.5
Installed in 1949	27,829.5
Installed in 1950	19,124.5
Installed in 1951	21,527.5
Installed in 1952	30,250.5
Installed in 1953 (estimated)	33,275
Total tonnage	229,918

Houston is the scene of the American Society of Heating and Ventilating Engineers annual meeting this month.



POSSIBLE WAYS of draining a high pressure line to a turbine or engine

Steam Piping Must Be Drained

. . . to prevent water hammer and resulting hazards

A SLUG OF WATER forced along by steam traveling at 70 mph may strike an elbow or other pipe fitting with sufficient force to burst it, explains the Hartford Steam Boiler Inspection and Insurance Co. in a recent issue of its publication, The Locomotive. Steam lines lacking provisions for adequate water drainage are subject to the hazard of water hammer which can be the cause of serious accidents.

A great number of steam lines are usually found in industrial plants running to turbines, process vessels, heating units and engines. Every piece of such equipment is subject to shutdowns, and during these idle periods condensate tends to accumulate in the steam lines. Draining the condensate before returning the line to service will not only minimize the danger of damage, but will also reduce the wear on the seating surfaces of the control valves.

Adequate drainage may often be accomplished by manually operated drains. However, automatic traps should be used if there is a chance that condensate may collect while the unit is in service. For large equipment — such as turbines and engines — it is advisable to install trapped separators in the steam lines.

To remove condensate that may collect above a stop valve in a vertical steam supply line, a small connection for a drain valve can often be welded into the piping above the stop valve or — if it is more practical — a drain may be tapped directly into the body of the stop valve.

For connecting a drain directly to a valve, manufacturers usually provide bosses on the relatively larger sizes of 250 lb cast iron body gate valves and on all steel gate valves. These bosses are located on the bottom and on each side of the valve casing, so that the tapping may be correctly placed at the point requiring drainage with the valve installed in any position.

If piping is so arranged that condensate can collect above the disc of boiler non-return valves during a shutdown, such valves should be provided with adequate drains. Otherwise an accumulation of condensate may be carried at high velocity through the steam line and prove dangerous. It is also important that drains be installed to remove condensate from pockets in other valves on boiler leads before such valves are opened and the boiler is cut into the header.

One method of insuring the removal of water that collects in steam headers — when the steam flow makes an abrupt turn in leaving the header — is by the installation of drip pockets. These act as small reservoirs and are emptied by automatically operated steam traps. Drip pockets are welded to the bottom of the header, and on long headers one drip pocket should be at each end.

Any type of expansion pipe bend which is installed vertically, or any riser in a steam line, should have provision for draining before the vertical rise. Small size piping may be drained effectively by a tapped boss or other small connection. However, lines of larger sizes should be provided with a drip pocket.

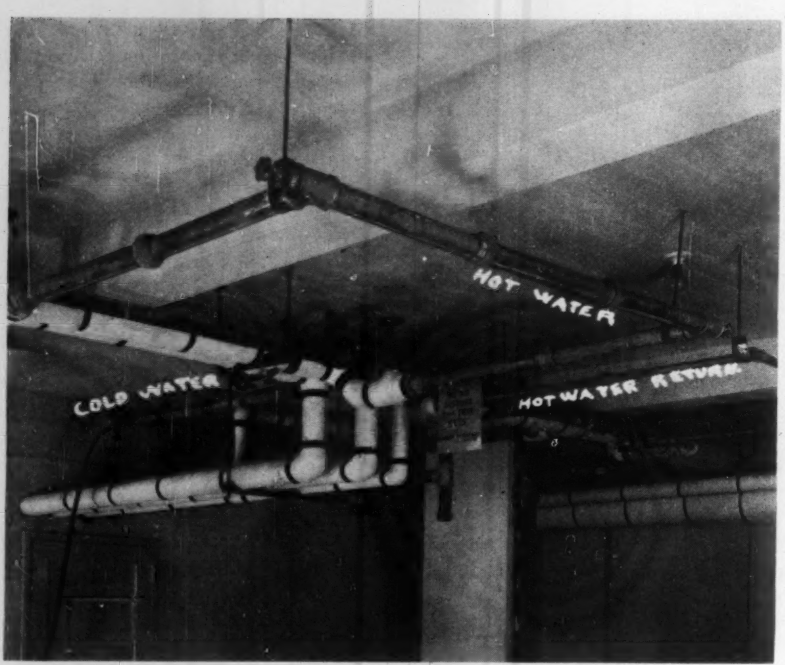
In addition to drainage of low points where condensate can collect during shutdown periods, long steam lines should be drained at intervals along the length and at the end of the line. Such drains should preferably be provided with drip pockets and traps. The length of the line, its contour and the conditions of steam flow must be taken into consideration in determining the correct number and location of the drains.

As long as traps and drains are kept in good condition and are operated correctly, they will continue to perform the job of clearing out pipe lines. The misuse or nonuse of this equipment will prevent the complete drainage of the condensate.

A recent accident which was the result of water accumulating in the steam line occurred in a midwest factory when a 250 lb cast iron boiler stop valve burst. Steam immediately filled the boiler room, and before the header valve could be closed, the steam pressure on three boilers had to be let down to atmosphere. The steam pressure was off for two hours and the cost of the rupture amounted to $1,200.

Just prior to the accident the boiler room foreman was preparing to cut a boiler in on the line. When he discovered that both boiler and line pressures were the same, he slowly opened the main stop valve three turns and then moved over and started to open the header valve. He had taken only a couple of turns on the header valve when he heard two loud hammerings. He ran back to the other stop valve with the intention of closing it, but as he reached for the hand wheel, the valve burst open. Fortunately, he was not hit, and he was able to get off the top of the boiler before being scalded.

In the investigation that followed, it was found that the gate valve next to the header had leaked and permitted water to collect in the line between the boiler stop valve and header valve. A drain was on this part of the line but it had not been used to clear the pipe. When the header valve was opened, in-rushing steam flowing as a result of unequal pressures forced the water against the main valve with great violence.



PLASTIC COATED PIPE has been tested in this building for three years

What's New in Pipe Coatings?

By George D. Lain, Research Engineer
Committee on Steel Pipe Research
American Iron and Steel Institute

Protecting pipe with new plastics and with metallic coatings applied by new methods is proving to be successful in extending the service life.

New protective pipe coatings are now available which extend the life and length of service of pipe for many applications. Plastics comprise one segment of this development and metallic coatings applied by new methods another.

Apply Thin Coats

Among the plastics, the baked phenolics have probably been used and studied to the greatest extent. These coatings are applied by the producers of such coatings or licensees at plants maintained by them — or they may be applied under their supervision on the job. With pipe, such coatings are applied to properly prepared surfaces to insure good adhesion. This preparation may consist of either pickling the pipe or blasting it with sand or grit. The blasting is generally preferred. The surfaces are then coated with the resin dissolved in organic solvents which are evaporated. The pipe is then baked to produce the desired coating. It is necessary to apply several thin coats, each followed by the drying and baking operation. The final baking must be at the right temperature to produce a monolithic film.

Due to the number of coating, drying and baking operations, this protection is used only where the expense can be justified. Since a minimum thickness of five or six mils is usually desired to insure against porosity and a mil or less is the amount that can be applied properly with each coat, five or six separate operations are required.

In most cases, parts to be coated should be fabricated prior to coating and, in the case of welding, care should be taken to remove all weld spatter or sharp projections. Also, welds should be free from porosity and should be ground smooth. If pipe with screw flanges is to be coated, all oil must be removed and exposed threads faced off. Sharp edges are difficult to coat, and therefore corners should be rounded.

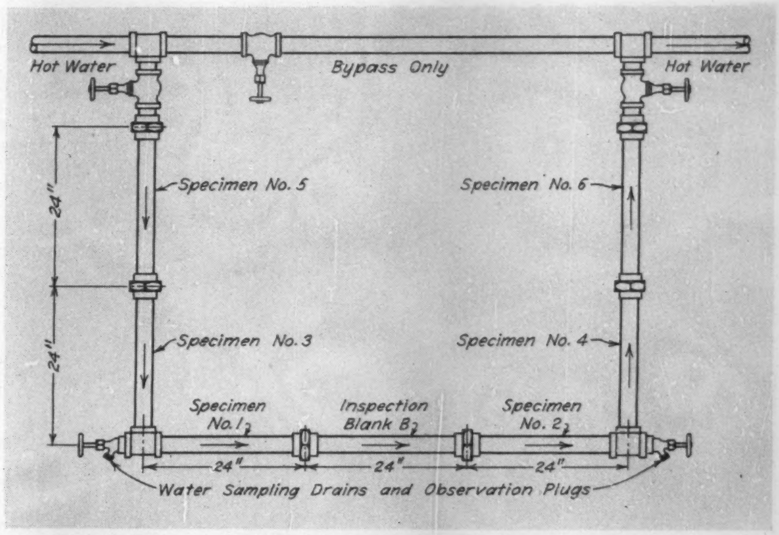
Pipe smaller than 2 in. nominal size is difficult to coat satisfactorily in usual lengths with this type of coating. However, in one instance a mill buys random length pipe, cuts it to length, threads it and screws on the flanges. The process continues by squaring the flanges with the pipe, coating and then baking the assembly with a blow torch.

For large piping installations, the lines are usually constructed of flanged sections or fittings which are made tight by the use of proper gaskets. About 13 years ago the Committee on Steel Pipe Research of the American Iron and Steel Institute became interested in the application of plastic as a coating for pipe when it was used in the low pressure boilers in a church and school near Montreal. An examination of the boilers in 1944 revealed that the coated tubes were in good condition after four years of service, and they are still in operation.

The committee has tested such coatings in hot water supply lines and they have also performed satisfactorily. In one test, hot water at the boiling point and specifically aerated was run through coated samples continuously for three years, and at the end of the test the baked phenolic coatings were in excellent condition. At Army posts where such coated specimens were incorporated in hot water supply lines, the performance has been good, and in a housing project in New York, samples are still under test and the condition after two years of service seems practically as good as new.

Many Applications

Other applications for such coatings have been in the paper, food, chemical and pharmaceutical industries and in dairy processing. When chemicals that rapidly attack uncoated steel pipe are conveyed, it is important that the coatings be free of porosity. In other applications, where the rate of attack on uncoated steel pipe is not serious, but where its use is not possible due to contamination or discoloration of the material handled, one or two thin coatings can often be used. In these applications, an occasional pore or break in the coating is usually not of sufficient consequence that it will harm such materials.



TEST LOOP permits examination and removal of coated pipe specimens without interruption of service

Baked phenolic coatings have also been applied to pipe, tubing and sucker rods used in the oil fields, particularly in those wells producing what are called "sour" crudes. Only the interior of drill pipe is coated, as experience has shown that failures due to fatigue stresses starting at corrosion pits developed only on the interior of such pipe. The outer surface of the drill pipe is polished by rubbing against the mud used in the drilling operation. Here again, a limiting factor is the coating cost.

Air drying phenolics are also available and tests of these are being conducted by the committee in cooperation with the users in several installations.

Flaked Coatings

Other plastic coatings of the vinyl type and which are air-drying are promising, but they are limited in their application to a maximum temperature of 150 to 180 F. Some of these coatings have flaked materials in the vinyl vehicle. One coating of this type is composed of stainless steel flakes in a vinyl vehicle and has been under test in hot water supply lines by the committee for three years. The results obtained have been very promising. Tests on this coating were initiated three years ago when the supply of zinc was limited. The first tests were made with a coating applied to cleaned steel pipe. Experience indicated that better adhesion of the coating was obtained by pickling and rinsing, followed by a phosphate dip and drying, and then a dip into the coating. The coating dries in five minutes sufficient for handling and can be used in 48 hr at room temperature. To speed up the process, it can be baked for an hour at 180 F.

Samples of pipe have been bent to the usual specified radii without flaking, and pipe so coated can be cut and threaded in the same manner as black or galvanized pipe. If desired, the reamed and threaded ends can be cleaned of oil and the coating applied by brush to protect them.

The interest in the development of these new coatings continues to grow as evidenced by the new series of tests that the committee is about to initiate on 10 or more coatings including the baked phenolics, air dry phenolics, plastisols, and several types of vehicles carrying flaked stainless steel, zinc dust or aluminum flakes. A study of the effects of temperatures slightly above the boiling point is planned in this series as there are indications that some of these coatings when applied to steel may withstand higher temperatures than are now recommended.

The question has been raised as to why flaked materials are used in plastic vehicles, as it is generally agreed that the vehicle provides the protection. It has been proven that such flakes tend to give heavier coatings with a single dip and impart the desired pigmentation to the coatings. For example, in one application, stainless steel flakes improved performance under a certain alkaline environment.

New Metallic Methods

Recently, the application of certain metallic coatings by new methods indicates other interesting possibilities. For instance, nickel coatings can be deposited by chemical means that are claimed to be pore-free and uniform on various surfaces such as threaded parts. Neither size nor shape appear to be a limiting factor in such applications. Good protection with less nickel is possible because of its freedom from porosity. The unusual feature about this process is that no electrical equipment is required. This development may lead to the use of nickel-coated mild steel pipe for many applications in place of the more expensive alloy or stainless steels.

Aluminum coatings applied by hot-dipping are also being developed. Aluminized sheets have been produced for some time now, and recently the mollerizing process was introduced — which permits the coating of pipe with aluminum by the hot-dip process. Chromium coatings applied by a method of impregnating the surface of steel with chromium in a diffussion process is accomplished by packing the parts in a patented powdered compound containing chromium, an energizer and an inert material; heat is then introduced raising the ingredients to the proper temperature.

With the importance of conserving critical materials being stressed in recent years, much has been done to develop new coatings and new applications of older coatings for special purposes. The net result is that less costly and critical materials can be used without sacrifice of performance and length of life of equipment. Of course, the proper selection of a coating for a given application depends upon the environment in which it is to be used.

THE PROBLEMS of proper temperature and humidity control for the storage and aging of the products of this large distillery are concentrated and magnified here since this is the world's largest beverage distillery on one site

Unique Air Balancing System

. . . utilizes outdoor air for control of temperature and humidity in distillery. Air conditioning also used in some processes

AIR BALANCING and air conditioning are solving many complex and often hazardous problems involved in the industry of making, aging and bottling a variety of alcoholic beverages at the Hiram Walker & Sons, Inc., plant, Peoria, Ill. Through the use of these two systems, not only the necessary temperature and humidity control is achieved in the production processes but also comfort for the employees and greater efficiency is attained.

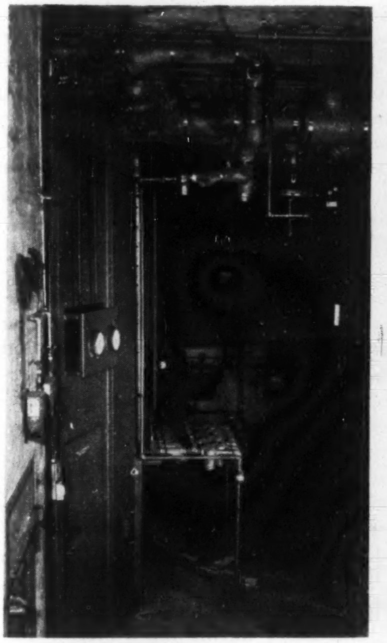
Air Control Essential

Since alcohol is a volatile fluid, the fumes emitted can become highly explosive under certain conditions. This constant danger requires vigilance upon the part of the distillers at all times. Also, other atmospheric problems are present in the distilling industry that require control of temperature and humidity. Botanicals, the ingredients which go into the production of gin, liqueurs and cordials, must be kept at appropriate temperature and moisture levels to prevent deterioration. Of course, the control of humidity conditions is also necessary to prevent the labels and government stamps from falling off filled bottles.

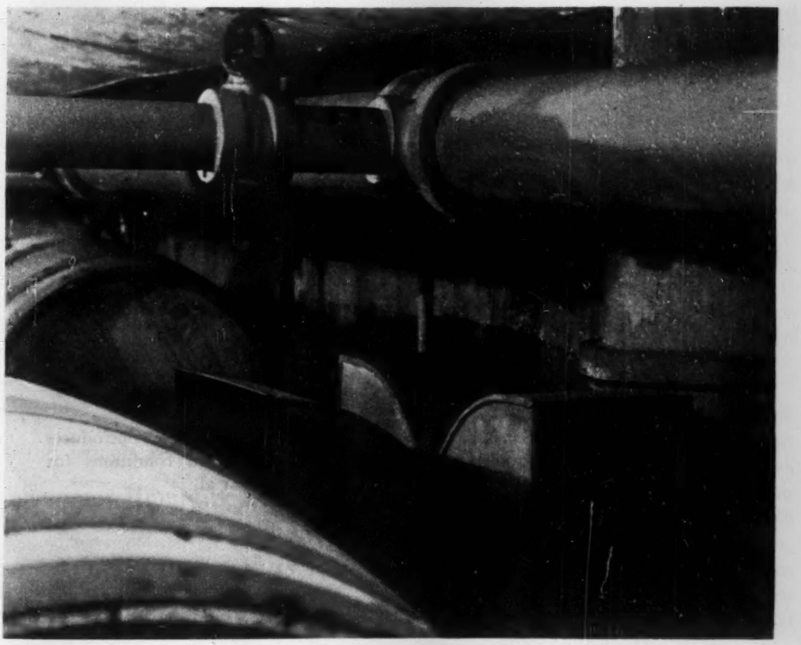
By using varied treatments and applications of air in this plant, the solutions to these problems have been satisfied in a unique manner.

These typical problems of the alcoholic beverage industry are concentrated and magnified here because this is the world's largest beverage distillery on one site. The plant includes 13 buildings devoted to the production, control and administration and 11 rack warehouses—10 of which are 11 stories high and one is 10 stories. Two have one basement, seven have two, and two have three lower levels. In all, the warehouses alone contain 22,365,000 cu ft in which atmospheric conditions must be right for proper product aging.

Grain is moved to the stills by air even before the distilling process begins. Conveyors transfer the grain from the grain elevator to the huge vats by suction. Large fans create a vacuum in the large suction tube through which the grain is drawn. This method of conveying the grain is favored not only because of its efficiency, but a greater degree



INTRICATE CONTROL system and arrangement of fans, dampers and heating coils permits proper balancing of inside and outside temperature and humidity conditions to provide the desired storage conditions for whiskey aging



THE AIR is introduced into the warehouse cell so that it flows around all of the whiskey barrels. Individual dampers are permanently set to provide the proper air distribution

of sanitation is also achieved. The smooth tubes offer no crevices in which grain kernels can lodge, rot and become a source of harmful bacteria.

Air Conditioning Applied

Air conditioning is used in the office area, laboratories, bottling rooms, and in the botanical storage plant. Office air conditioning is for the benefit of personnel — for human comfort and added productivity. Air conditioning for the protection of ingredients is concerned with the botanicals, which are delicate fruits, seeds and roots used in the distilling processes. These botanicals are harvest crops — seasonal products which are subject to good and bad growing years and to spoilage if storage conditions are not favorable.

Preserving the Botanicals

Among the 20 different types of botanicals imported from virtually every part of the world by Hiram Walker are juniper berries, coriander seeds, dried orange peels, sloeberries, anise, cassia bark, horehound herb, caraway seeds, roasted cacao nibs, vanilla beans, licorice, and angelica root. Hundreds of thousands of pounds of these exotic products of faraway lands are kept in refrigerated storage to protect their essential oils. They are stored in a room where the temperature is kept at 35 F. The relative humidity is maintained between 60 and 70 percent by recirculating the room air through calcium chloride.

The botanicals are kept in the burlap bags or woven sacks in which they are received and are stacked in crisscross fashion, allowing for sufficient air movement between them. Periodic tests are made of the botanicals to be sure that they are not losing flavor. Since the adoption of refrigerated storage methods in 1936, the botanicals have never suffered any deterioration — not even in the case of those stored for periods up to five years during and shortly after the last war.

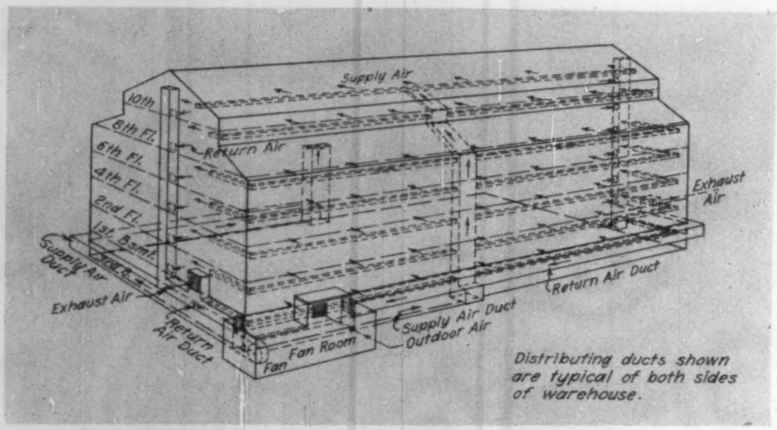
Bottling with Air Conditioning

Air conditioning in the bottling rooms has a dual purpose — providing comfort and aiding production. Proper temperature and humidity are necessary to insure that labels and government stamps on filled bottles will set. Under conditions of excessive heat and humidity, stamps and labels will slide or slip off bottles. Needless to say, the loss of either stamps or labels would be distastrous to a shipment of alcoholic beverages. Cleanliness of the air is also vital in the bottling process.

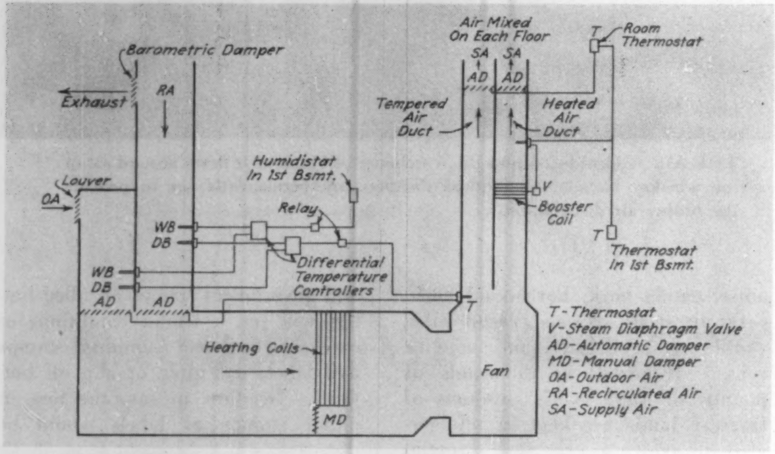
Since the two bottling rooms are large and have high ceilings, two 40 ton air conditioning units are used — one conditioner for each room. The conditioners are of the water spray type using chilled water. Outdoor air is admitted continuously — 15 percent of the total flow rate — and is forced through the spray by a fan; then it passes through the ducts into the bottling rooms. The ducts extend along the walls and top center of the rooms just below the ceiling. A large return air duct is in the corner of each room. The temperature is controlled between 70 and 77 F, depending upon the season, and the relative humidity is maintained at 55 percent. These conditions have been found to be the most pleasant to the employees.

Air Balancing Method

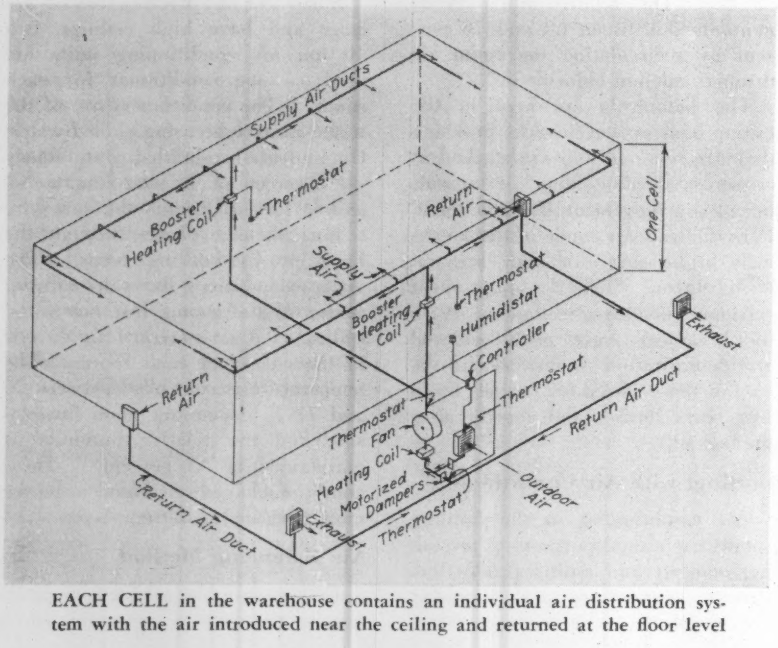
Proper aging of whiskies by storage is one of the most important


Supply Air
10th
8th Fl.
6th Fl.
4th Fl.
2nd Fl.
1st. Bsmt.
Return Air
Exhaust Air
Supply Air Duct
Exhaust Air
Return Air Duct
Fan
Fan Room
Supply Air Duct
Outdoor Air
Return Air Duct
Distributing ducts shown are typical of both sides of warehouse.

EACH WAREHOUSE has an extensive ventilation system which introduces outdoor air and recirculated air to provide the desired conditions for whiskey aging. Warehouse No. 14 is the key control for all


Barometric Damper
Exhaust
RA
Louver
OA
Humidistat In 1st Bsmt.
Relay
WB
DB
WB
DB
AD
AD
Differential Temperature Controllers
Heating Coils
MD
Air Mixed On Each Floor
SA
SA
AD
AD
Tempered Air Duct
Heated Air Duct
V
Booster Coil
T
Room Thermostat
T
Thermostat In 1st Bsmt.
T
Fan
T-Thermostat
V-Steam Diaphragm Valve
AD-Automatic Damper
MD-Manual Damper
OA-Outdoor Air
RA-Recirculated Air
SA-Supply Air

THE CONTROL SYSTEM for the air balancing system permits the inside and outside temperatures to be balanced so as to obtain the desired control in the warehouses


Supply Air Ducts
Thermostat
Booster Heating Coil
Return Air
One Cell
Supply Air
Booster Heating Coil
Thermostat
Humidistat
Controller
Exhaust
Return Air
Thermostat
Fan
Heating Coil
Motorized Dampers
Thermostat
Return Air Duct
Outdoor Air
Return Air Duct
Exhaust
Thermostat

EACH CELL in the warehouse contains an individual air distribution system with the air introduced near the ceiling and returned at the floor level

aspects of the distilling industry. To provide the optimum conditions for this stage of the process, a survey established that the maintenance of a specified average annual temperature was best for proper aging of whiskey in storage. To arrive at this temperature, a method of balancing air temperatures was decided upon which could be used to offset the heat of summer with the cold of winter. The air balancing method consists of an extensive ventilation system which balances inside and outside temperature conditions to obtain the desired control in the warehouses.

Temperatures Averaged

With this annual mean temperature as the control objective, the summer temperatures are averaged and it is then determined what temperatures will have to be maintained in the warehouse during the winter. The warehouses are kept as cool as possible in the summer by admitting night air. Higher summer temperatures are offset by the lower winter temperatures.

Low Humidity the Aim

In controlling the humidity, the goal is to maintain the lowest possible percentage by drawing in outside air when its moisture content is lower than that inside the warehouse.

Basically, the air balancing system in each warehouse consists of dampers which permit air to be admitted or withheld from the large fans that force the air through ducts connected with every floor of the building. These ducts extend along the walls just below the ceiling, and have outlets at regular intervals. The incoming air forces out stale air through the return air ducts on each floor. Outdoor air is taken into the building only when the temperature and relative humidity are such that its use will be more advantageous than the use of recirculated air in maintaining the desired conditions in the building.

One Warehouse the Key

The newest warehouse on the site, No. 14, is the key to the system for all warehouses because it is equipped with automatic controls which determine the standards to be placed into effect manually in the other warehouses. The control system in

No. 14 is arranged for operation on two cycles which can be called "winter control" and "summer control." It involves the use of two differential temperature controllers, a humidistat and a thermostat located in the fan discharge duct used to control the outdoor air and recirculating air dampers. The controllers have two bulbs each. Each has a bulb in the outdoor air duct and another in the recirculating air duct. One of the controllers has both bulbs so as to serve as "wet bulbs," and the other controller's bulbs act as "dry bulbs." The humidistat is located in the first basement of the warehouse and controls the outdoor air and recirculating air dampers. The fan discharge duct thermostat is in series with the humidistat and dampers and controls the amount of outdoor air entering the mixing chamber when the winter control system is in operation.

Winter Humidity Control

Winter control operation requires the removal of the wet bulb attachments from the bulbs of one differential controller to allow it to act as a dry bulb thermostat that will respond to temperature changes in the same manner as the other differential temperature controller. The humidistat causes the dampers to open which will admit more outdoor air of lower moisture content, by increasing the air pressure in the lines to the relays, if the humidity in the warehouse rises above 55 percent. The relays — operated by the differential controllers — will open and allow the air pressure to be passed on to the fan discharge air thermostat only if the outside air temperature is lower than the recirculating air temperature. The fan discharge thermostat controls the air pressure to the fresh air damper, which is normally closed, and to the recirculating air damper, which is normally open, to maintain a constant temperature of 45 F or of the setting of this thermostat, by mixing outdoor and recirculating air.

If the humidity in the warehouse is high, the humidistat will call for outdoor air. The amount of air that enters the fan is controlled by the fan discharge thermostat. This thermostat operates the outdoor air and circulating air dampers to mix the desired quantity of outdoor and recirculating air to discharge air from the fan at 45 F. The colder the outside temperature, the less outdoor air is admitted by this thermostat. As the humidity in the warehouse falls, the air pressure in the lines from the humidistat decreases, causing the outdoor air damper to move toward the closed position and also causing the recirculating damper to move to the open position. If the outside air temperature rises above the temperature of the air in the recirculating air duct, the relays close, causing the outdoor air damper to fully close and the recirculating air damper to fully open, causing 100 percent recirculation.

Summer Humidity Control

During the summer control period, the wet bulb attachments on the bulbs of one differential controller must be replaced to convert the bulb from a dry to wet bulb attachment. The wet bulb controller operates one relay, the dry bulb controller the other. Because these relays are connected in series, each of the controllers causes its respective relay to open before any air pressure in the line from the humidistat — located in the first basement — can be transmitted to operate the dampers.

If the humidity in the warehouse rises above the setting of the humidistat, the air pressure to the relays increases. The relays will open only if the wet bulb and dry bulb temperatures of the outside air are lower than that within the warehouse. If the relays open, air pressure is transmitted to the fan discharge air thermostat which is set for a minimum temperature of 45 F.

Normally, during summer control this thermostat is inoperative due to its low setting, and it allows air to pass through directly to the dampers. The air pressure from the relays causes the outdoor air damper to open and the recirculating damper to close. As the humidity in the warehouse falls, the outdoor air damper will approach its closed position and the recirculating damper its open position. If the outside air wet bulb or dry bulb temperature rises above the inside air wet or dry bulb temperature, the wet or dry bulb controller will close its respective relay, thereby breaking the circuits to the dampers. With this the outdoor air dampers will close and the recirculating air dampers will open, resulting in 100 percent recirculation.

Heating the Cells

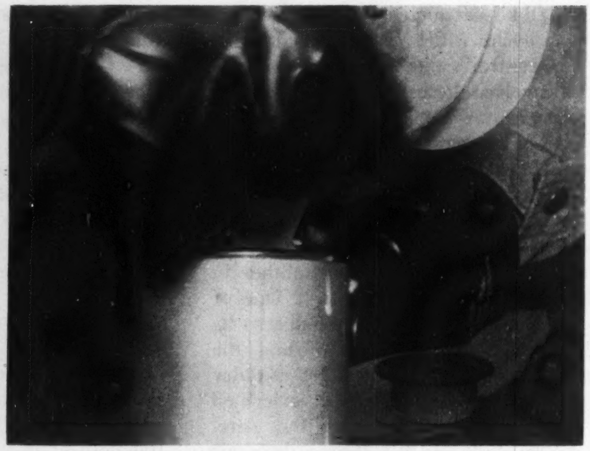
Heating the cells of the building is accomplished by a separate system of controls. A thermostat in the first basement operates a relay whenever the cell temperature drops below the thermostat setting of 55 F. The relay in turn causes the room thermostats that are located on each floor of the building to be put into operation, thus achieving zone control is each cell.

The room thermostats control the blending dampers which admit heated air into the cells that has passed through the booster coils in the supply duct from the hot face and tempered air from the cold face. As the cell temperature approaches its setting, the hot face damper closes and the cold face damper opens, admitting air at 45 F.

When under summer control, all of the air delivered into the cells comes from the cold face. The above relay also causes a thermostat located in the heated air duct above the booster coils to go into action. This thermostat controls the steam valves for the booster coils, keeping the temperature of air leaving the coils through the duct at approximately 80 F. If the temperature in the first basement rises above 55 F — the setting of the thermostat in the first basement — the thermostat causes the relay to close. When the relay is closed, the thermostats controlling the blending dampers in the cells are rendered inoperative. This causes the hot face damper to be closed and only tempered air is admitted into the building. At the same time, the steam valves for the booster heaters in the ducts are closed.

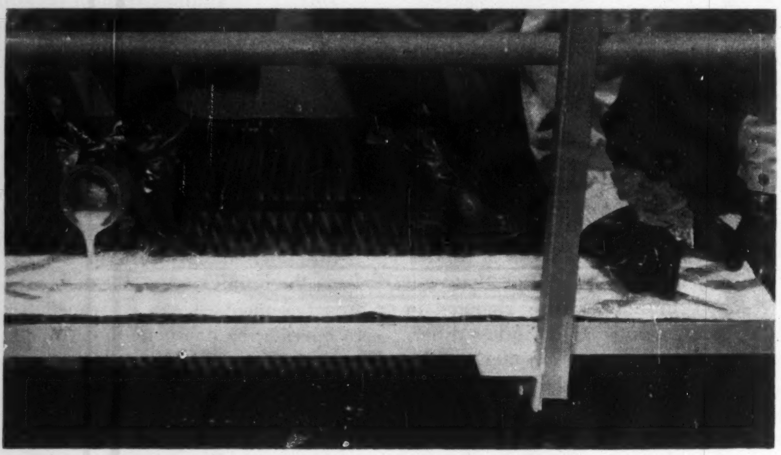
Thermometers are positioned on the first, ninth and 11th floors of all warehouses and are checked at the same time each week. Also, data is collected on fan operation, amounts of outdoor and recirculating air delivered and special readings for the roof and basement areas. Average figures on all warehouses, the comparison with the figures for the preceding year and the average outside temperature conditions are noted. The first data was obtained in 1934 when the plant was constructed, and improvements in the air balancing method are still being made.

1 THE FIRST STEP in applying this new method to patching piping is fitting a void cover



2 NEXT, THE GLASS tape is coated with the liquid plastic material

3 THE PLASTIC COATED tape is then applied



4 THE GLASS MAT is coated with the remainder of the liquid plastic so that it becomes impregnated

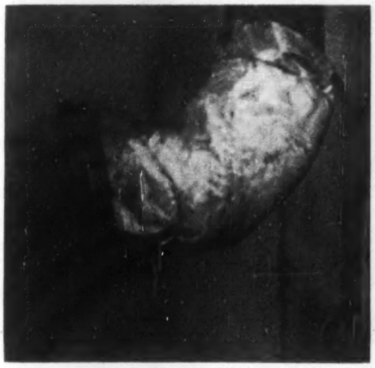
5 THEN, THE IMPREGNATED glass mat is applied over the tape for the purpose of adding strength and creating mass for a fast cure

6 THE FINAL STEP consists of applying paper over the patch to confine the liquid plastic during the curing process

New Method of Repairing Piping

. . . is use of plastic patches by Navy. Method has industrial applications

By Howard S. Dewey



7 THE COMPLETED PATCH will serve as semi-permanent repair for some time

PLASTIC PATCHES for piping which have all the functions and speed of an adhesive bandage have been developed by the U. S. Navy at their damage control training center with the help of the Bureau of Ships. Many industrial applications of this new method are foreseen. A test case was witnessed by national and local civil defense leaders and naval officers recently in which a ruptured water main was repaired in approximately 30 minutes. The patch was strong enough to withstand a pressure of 300 psi.

Research and development studies, which started in 1951 at the damage control training center, are no longer regarded solely as developmental experiments — these patches will soon be standard equipment in the Navy. The plastic patch will have many uses in making emergency repairs of battle damage. Also, the national civil defense officials are impressed with its possibilities for similar repairs to city water systems and other piping in the event of bombing attacks.

The materials used in the plastic patch include: a void cover which is a fibrous glass cloth with a cured resin surface, a resin and activator, a mat that is similar to an insulating material in common use, a machine for coating the fibrous glass tape with activated resin, and other miscellaneous items.

The resin and activator combination results in an exothermic action developing in excess of 140 Btu per lb. The glass mat used in certain special applications of the patch is a flat matting, compressed of glass fiber rovings, unwoven. To provide sufficient tensile strength for the application procedure, the mat is reinforced at 2 in. intervals with nylon stitching.

Availability and Application

Currently, the materials are available in a kit, designed specifically for shipboard use. Also, a small "laboratory test" unit is available which will permit potential users to test its properties on mockups or at the research level.

Plastic patch materials — before hardening — are as easily worked as tape and putty and can be applied by unskilled personnel. The patches are hardened into a steel-strong, watertight casing around the damaged area when the heat is generated by the patching components.

Application is quick and provides an emergency method of repairing a wide variety of damage to piping, flanges, elbows and other fittings of various sizes. It also presents the answer to making quick repairs to inaccessible or dangerous ruptures or where replacement parts are not quickly available.

Odd shapes and jagged protrusions in ruptured pipes are no obstacles, and applications of the patch under most conditions are limited only by the working space. Completely severed ends of pipe can be successfully joined and "sunflower" types of bursts with jagged edges can be covered.

The U. S. Navy has successfully repaired pipes where both ends have been severed, voids in excess of 9 in. have been gapped to give continuous service under working pressures. Maximum pressure resistances of the patch vary of course — with working conditions and surfaces. Under ideal conditions of application, patches have often withstood pressures in excess of 1,000 psi.

The plastic material has been examined for toxicity and has been approved. While it may be handled safely with bare hands, the use of rubber gloves is recommended where prolonged and continuous contact is anticipated.

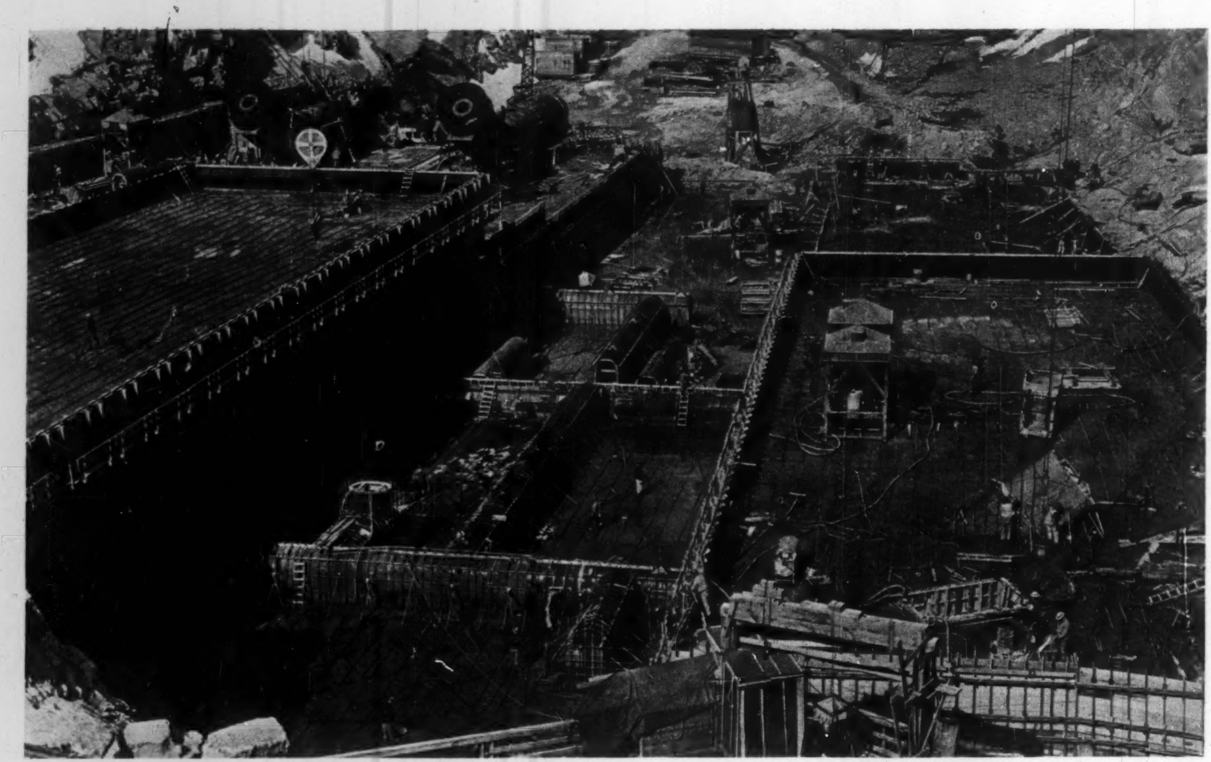
Good Performance

Laboratory tests are not complete at this time. However, indications are that the material is relatively impervious to all petroleum-base materials, solvents, salt and fresh water at all temperatures as well as flammable gases. Its resistance to acids increases as concentrations are reduced.

The adhesion of the patch is good, and expansion and contraction have not yet presented any problem. No special storage precautions are required, but it is believed best to store materials at temperatures below 115 F; 70 F is preferred. No special preparation of metal surfaces is required other than to clean with a rag. Tests indicate also that the patch will adhere equally well to iron, steel, copper, brass, certain plastics, glass, rubber, ceramics and asbestos.

Because the material is relatively new, statistics on the permanence of any given repair are not known. A few test patches, however, have given 100 percent performance for almost a year, and there is good reason to believe that a patch properly applied under reasonable working conditions can be considered at least semi-permanent or feasible within the average preventive maintenance program.

Mr. Dewey has had several years of experience as an engineering officer in the U. S. Navy.



THE STEEL TUBING for cooling the concrete was embedded in the various blocks or sections of the dam. Several of the sections with the tubing in place before the concrete was poured are shown here

840 Miles of Tubing

By C. L. Townsend
Engineer, Bureau of Reclamation

. . . cools concrete during construction of Hungry Horse dam

By circulating cold water through 840 miles of steel tubing embedded in the Hungry Horse dam in Montana, the construction was completed in only 25 months of concrete placement — well ahead of schedule. Controlling the temperature of the 3 million cu yd of concrete in the dam as it set and hardened was largely responsible for the rapid schedule which was followed in the construction.

Heat of Hydration Removed

Cooling of the mass concrete for the dam was done for two reasons. First, during the setting and hardening of concrete, a large amount of heat is developed in the process of hydration of the cement. For the 3 million cu yd mass of the dam, the temperature of the interior concrete would have risen as much as 60 F above its pouring temperature without controlled cooling — and, as the distance between contraction joints was as much as 186 ft, severe cracking would have occurred when the temperature dropped to its final stable state. By circulating cold water through the tubing, a large part of the heat of hydration was removed as it developed.

Volume of Concrete Reduced

The second reason for artificially cooling through the use of the embedded tubing system was to reduce the temperature of the concrete to 38 F — a temperature below the final stable temperature. At this temperature, the volume of the concrete was a minimum, and all contraction joints between blocks were opened wider than they would ever open again. This temperature state was reached by circulating water through the tubing for approximately 40 days, after which the open joints were filled with cement grout so that the dam was formed as a monolithic structure rather than as a discontinuous series of blocks.

Cold water was circulated through coils of thin wall, 1 in. OD steel tubing embedded in a grid pattern over the top of each 5 ft lift of concrete — during the placement of the concrete over the tubing and for a period of about 16 days thereafter. This method of cooling the concrete, in addition to allowing for a definite time of exposure for the top of each lift of concrete, reduced the temperature rise to about 20 F.

Expansion Couplings

The steel tubing was shipped to the dam site in random lengths — from 17 to 22 ft — and was assembled with metal expansion type couplings. This type of coupling was originally developed for the Hoover dam to be used where the tubing crossed contraction joints. The coupling proved to be so economical and easily installed that it was used at Hungry Horse to join all lengths of tubing. The length of each individual coil of tubing was determined primarily by the size of the concrete block that it was to serve, and ranged from 800 to 1200 ft. For the larger blocks in the dam—those 80 ft wide by more than 80 ft long—two or more coils were used so that the maximum length of any coil was not more than 1200 ft. If more than three coils were required to cover the block, an embedded 1½ in. header system was used so that a single inlet and outlet extended to the downstream face of the dam.

Water Flow Reversed

To supply the embedded cooling coils with water, a supply and return header system was installed on the downstream face of the dam. These headers were located adjacent to alternate transverse contraction joints for easy access to the cooling coil connections. In general, 6 in. standard pipe was used for the supply and return headers. Main supply lines, 12 in. in diameter, crossed the downstream face of the dam where required and supplied water to the headers. The flow of water in the cooling coils was reversed once each day by reversing the flow in the 12 in. main, rather than changing the connections between the headers and the inlet and outlet of each cooling coil. After the water circulated through the cooling coil, it was passed down the return header and was wasted to the river.

Water for the cooling system was obtained throughout most of the construction period from a small tributary creek near the dam site. The creek was selected because of its uniform flow of cold water throughout the year. This water was piped to a reservoir tank and then it flowed to the dam by gravity through the 12 in. supply lines. Later during the construction period, a pump barge having a 500 hp pump was brought to the reservoir upstream from the dam and was used to supply cold water to the cooling system. Reservoir water ranged from 8 to 15 F warmer than that obtained from the creek; for this reason final cooling to 38 F by use of the reservoir water was not possible until late in the winter.

The supply mains and headers were insulated during the winter months when concrete placement was suspended to protect the lines from freezing during the 40 day cooling period prior to the grouting of the contraction joints in the spring. Wooden housings were placed over the risers, and electric heaters were placed at the lowest point of each section of housing.

Spacing the Tubing

To obtain the most effective cooling rate of the mass of the concrete, 3 ft horizontal spacing of the tubing was adopted wherever the block length was greater than 125 ft; 4 ft spacing was used where the block length was 125 to 80 ft; and 5 ½ ft spacing was used where the block length was less than 80 ft. Another effective method of controlling the cooling rate was to reduce the temperature of the cooling water at the inlet to each coil; that is, the coldest river water available at the time of cooling was required to be used, and the final cooling before contraction joint grouting started was required to be done during the winter months.

Changing the quantity of water supplied through coils was found to be ineffective in controlling the cooling rate. When laminar flow was exceeded, the flow was turbulent and little change in the cooling rate could be effected by increasing the flow rate. The designated rate of flow in the cooling coils was set at 4 gpm or 2 fps. This rate was well within the region of turbulent flow and reduced the tendency for the tubing to become clogged by sediment. Varying the size of the cooling tubing would have affected the cooling properties, but economical considerations led to the use of the 1 in. tubing. Studies showed, for example, that increasing the size of the tubing 10 times would only double the cooling rate.

[An article describing the heating and ventilating system for the Hungry Horse power plant appeared in the August 1953 HPAC.]

Water Shortages May Become More Acute

With the big demand for cooling systems predicted for 1954, the problem of solving water shortages may become increasingly acute, according to Matthew M. Lawler, vice president of Worthington Corp.'s air conditioning and refrigeration division.

He feels that within the next few years, if the prolonged seasonal dry spells continue in so many parts of the country, more municipalities may have to restrict the use of water for air conditioning consumption.

"Water department officials have two varying opinions on the subject," says Mr. Lawler. "One group maintains it is their job to provide adequate facilities to meet the demand, while the other group advocates the conservation of water as a valuable natural resource. Both groups are correct, depending upon their location and the availability of water supplies."

Available methods of satisfying most water conservation ordinances and saving on water costs include air cooled condensers, fan coil units, cooling towers, and evaporative condensers, he points out.

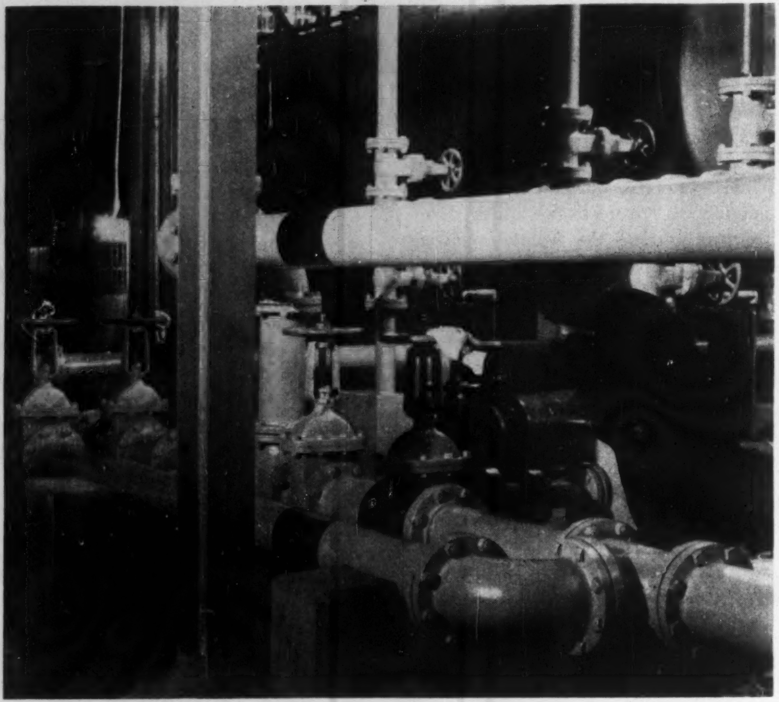
In reviewing 1953 sales, Mr. Lawler says sales of commercial packaged air conditioners increased 60 percent over 1952. The overall sales volume for the air conditioning and refrigeration division increased 16 percent over the previous year.

"We expect a 40 percent increase in our total volume of sales in 1954," he says, "with an increase of 60 percent in the sales of commercial packaged air conditioners alone."

ANYTHING CAN HAPPEN

How To Operate a Valve

By Bill Dopp



HAND OPERATION is only one of several ways to open or close a valve — as explained here

• *Almost anything can happen when you're in the engineering, operating, contracting or sales ends of the heating, piping and air conditioning industry. The objective of this more-or-less regular editorial feature in HPAC is to discuss practical problems that need solving — and ways to solve them.*

Bill Dopp has had 40 years of experience dealing with piping, including a long stretch of service as a sales engineer. He is devoting some of his present leisure to drawing on his many piping experiences, as he does in this story . . . .

"YOU CAN'T AFFORD IT." The quizzical smile on Martin MacVane's face was nearly as comical as the look of astonishment on the face of old John Curran, operating engineer at the "Hampton Wood Products Mill."

"What do you mean, I can't afford it?,"the crusty old man asked.

"Just what I said," replied Mac. "Do you know what a motor operated valve up there would cost you?" The gasket salesman looked up toward the roof. He and John were old friends, so he could speak without fear of offending him.

Motorize That Valve?

They were sitting at the desk in the corner of the boiler room discussing things in general when the old engineer pointed to an 8 in. steel valve near the ceiling and remarked, "I'm going to put a motor on that valve. Ever since that leak developed in the mill on a Saturday night I have had to climb up there every week end and close the blamed thing. Then, Monday morning — before I'm half awake — I have to climb up there and open it. Jim Drew, the superintendent, insists that it be closed over the week end."

"What happened?" asked Mac.

"Several weeks ago a leak was discovered out in the mill on a Sunday. The leaking condensate had spoiled a lot of material. So now I pay the piper by climbing up there to open and close it," replied John.

The plant was an old one, far from the clean and polished plants that almost run themselves. Here, everything seemed to be an addition to something that was in before. In spite of the antiquity of the equipment, John Curran kept the plant producing and things reasonably shipshape. He usually got his way, too, when he wanted to do something, although he might have to do a lot of arguing to get it. "I'll get a motor and fix a couple of pads on that yoke," he said. "Then, by using a couple of gears I can sit here, push a button and let the motor do the work. Boy, that will save a lot of climbing."

"What is going to stop that motor when the valve is closed, John?"

Mac's question brought a frown to his friend's brow. "Why," — his thought trailed off. It was clear that he was dreaming of the joy of licking that climb. He had really not given the problem much thought.

Will Motor Stop?

"John, I said you could not afford to motor operate that valve. Here's why. If you will think for a minute, you will realize that it is not just a question of applying mechanical power to a valve that is involved. If the thing is going to work, that equipment must do everything that you would do when you close the valve by hand. Into it must be built a lot of intelligence. In fact, the motor operator has to be able to do things that you can't do. One of those things is to know when to stop." Mac was grinning. "You stop when you think the valve is closed or when you get tired. This operator has to know when the valve is closed. If it does not stop at the right time, the disc could be jammed into the seats so that it would be almost impossible to get it out. A valve can be ruined very easily that way."

"You're making this very complicated — I'll bet I can rig up some kind of a gadget that will do the trick," John contended. "Motor operated valves are used all over. From what I hear, they really do a good job, too."

"You're right, they do. These valves you are talking about are not the kind of makeshift outfits you have been thinking about though. John, the valve people have spent 30 years and many thousands of dollars in trying to get a motor operator that would work properly and with little trouble. There have been at least a dozen designs tried and discarded. The problems have been licked only as a result of a lot of expense and hard work." Mac handed John a cigar. "Here," he said, "smoke up while I try to tell you something about these valves."

"Thanks. Go ahead with the lesson." John knew that he had no choice now.

Controls Necessary

"When you decide to close a valve, you must first of all think of which way you are going to turn the handwheel. Your motor operator has to turn the yoke sleeve in the right direction or there will be trouble. That means that you must have an electrical control panel that will positively insure that the stem turns in the direction you want it to turn. It must then reverse the direction when you decide to change the position of the disc in the valve. You see, John, you will have to have a pushbutton station that has at least two buttons, one for closing the valve and one for opening it. There should be a third button for stopping the movement of the disc in case you change your mind. This will also make it possible to test the operator without completely closing the valve. Your station should also have indicating lights to tell you the position of the disc or if it is in motion."

"Is there anything else?" John was inclined to make fun of Mac for his seriousness.

Seating, Opening the Valve

"That's only the beginning," replied Mac. "When you close that valve with a motor, you are applying even, steady power to the stem. It won't seat the valve in the same way or in the same place as if you closed it by hand. If you let the motor stall, you are likely to burn it up. So a limit switch is provided to stop the motor when the disc is seated. A torque or thrust type of switch has, after years of experience, proven to be one thing that will stop the motor when you have a predetermined load on the stem of about 30,000 psi. You could never get that kind of seating by hand."

"I'll say you couldn't," observed John. "Do you need that much load to close it?"

"Not necessarily," answered Mac. "You can set the load for any value that you want to. That has been found to be a pretty satisfactory stopping load, though. This raises another problem, however, that has to be taken into account when you try to open the valve. Into your operator you may have to build a hammer-blow mechanism to start the disc from its seat or you will stall the motor instead of opening the valve. An ordinary motor won't stand up under that kind of operation, so we have to provide a high starting torque motor which can increase its speed to almost maximum before the main gear has made one-eighth of a turn which causes the hammer blow to strike. The motor has to be specially built and designed for this particular purpose."

Can You Afford It?

"This is getting to be a pretty fancy machine. How much does a rig like that cost?" John closed one eye and looked at Mac shrewdly.

"That's a 300 lb steel valve up there, isn't it?" asked Mac.

"Yes, that's right," replied John.

"Oh, a new 8 in. motor operated valve with panel and station might probably cost between $1500 and $1800. Add another $100 for installation and you can sit back and enjoy yourself while the motor does the work."

"You're joking, Mac," said John in astonishment.

"No, I'm not joking. Whenever you build intelligence and safety into a piece of equipment you are putting in money — often a lot of it. It has taken years to develop these operators so that failure is almost unheard of today. A lot of damage has been done in the past by failures, but those days are gone. Now valve motor operators are as reliable as any piece of equipment in a plant.

"That's fine," said John, "but why would anybody invest that kind of money in a valve? You were certainly right when you said I couldn't afford it."

A Matter of Insurance

"There are three good reasons for buying the best motor operated valve you can get. First, it is a matter of insurance. In a plant where there is a possibility of mechanical failure of equipment or where explosion or any serious risk to personnel can develop from failure of piping, an emergency motor operated valve should be installed. This should be in the main line outside the danger zone. Pushbuttons should be provided at points of easy access, so that in case of accident the valve can be closed in a matter of seconds. This is inexpensive insurance. However, the first cost and the interest on the investment are not the only premiums that must be paid on this kind of insurance. Unless that valve is operated at regular intervals to insure safe and positive action, the time may come when it is needed and it will fail to work. That would be like a lapsed premium." Mac was serious now, and John gave him close attention.

Valve Fails to Close

"Let me tell you of a case where failure to test a valve really hurt. There was an installation of condensers on the top of a river bluff. The circulating pumps were over 100 ft below on the river bank. Motor operated valves were provided in the inlet and outlet of the condensers so that both valves would close if a power failure on the pump occurred. Things worked fine the first time there was a power failure. Many months went by before this occurred again. This time, the valve on the outlet of the pump failed to close, the condenser drained out and about 200 tubes collapsed — costing a lot of money and an expensive shutdown."

"What happened?," asked John, deeply interested.

Frequent Testing Mandatory

"Those valves had not been tried during all of the time between the failures. As a result, a seemingly obvious error was not discovered. When the dustproof panel was being installed, the electrician had punched out one too many of the knock-outs in the case. He left one on the bottom of the box open. This was in a cement mill and dustproof equipment had been provided on everything. Here, cement dust had worked into the case — coating the contactors. Eventually, the dust hardened into a thin coating of cement on all of the contact surfaces. When the control switch at the pump was actuated, the coated parts could not perform their function and the accident occurred just as if there had been no insurance at all. Had these valves been tested once a month to insure that everything was working properly, the mistake would have been discovered and the failure prevented." Mac paused for a moment. "All safety equipment is a danger unless it is regularly inspected and tested."

"Mac, there's a lesson in that story on other things besides motor operated valves. I'm going to check every piece of safety equipment we've got before the day is out. It scares me when I think about what could happen if some of those things didn't work in case of an accident."

"Diligence is the cheapest insurance there is," said Mac, as he struck a match for John, who had let his cigar go out.

"No argument there, Mac, but what about the other reasons for buying motor operated valves?"

Save Labor

"Well, the second reason would be to save operating costs in the form of labor where valves had to be operated with considerable frequency. Sometimes, valves are of such a size that it takes more than one man and a considerable amount of time to open and close them. I learned the other day that it takes 50 turns to open a 24 in. standard iron valve. At two turns a minute that would take two men nearly half an hour. A motor operator with the disc traveling 12 in. per minute would take two minutes. For a valve that has to be operated often, that is a saving. The investment would be fully justified." Mac leaned back, eyeing the valve that had started the discussion.

"You mean that only once a week would not pay?" John grinned as he asked the question. "I agree with you on that. What's the third reason?"

Making the Plant Versatile

"To obtain plant versatility," Mac replied, "In a modern plant, flexibility has become one of the most important factors. The sudden changes of load just have to be handled rapidly and positively. This often means that several valves must be opened or closed simultaneously or that several valves some distance apart must be operated at the same time. Without the help of motor operated valves, the operation of our modern plants would be impossible. The operator at the control panels has every pipe line function under complete control. But again — there must be no failure. When he pushes a button, there must be no question in his mind."

"So that settles my putting a motor on that valve. I'll just have to continue to climb up there every weekend, I suppose." Mac knew that John was joking, but he gave no sign.

Use a Cylinder

"Not at all. You could put an air cylinder on the valve or even a hydraulic cylinder. Either one would cost less than a motor operated valve, but you would still have to provide safeguards to insure proper operation. They have to be maintained and they do require more space. Where a fire hazard prevents the use of motors or where large valves must be operated rapidly, they serve splendidly. When properly engineered and cared for they have an unusually long life. Like any other equipment, they repay for attention and are apt to collect damages for neglect." Mac kept hammering away on the same old theme. "I'll tell you what you can do, though — for a relatively low cost, too."

"What?," asked John eagerly.

Chain Wheel, Gears?

"Turn that valve on its side and put a chain wheel and guide in place of the handwheel. By cutting away a bit of that catwalk, you could let the chain hang down and operate the valve from this floor," answered Mac.

"If you had tried to operate that valve with the steam on, you would hardly want to try it with a chain wheel. Besides the valve would lay right across the walk. It would be a danger to anyone climbing over it." John was emphatic.

"There's another way to handle this," declared Mac. "Leave the valve upright and put a pair of spur gears on it. Then drop an extension stem down along that wall to this floor. Put a couple of universal joints in the extension, and with a gear reduction the valve will be easier to operate. The cost would be moderate, too. By the way, does that valve have a bypass?"

"Yes," replied John, "a ¾ in. bypass. I'd hate to put gears on that little valve."

"You don't need to. Just turn the valve with the stem down. A light extension stem will do the trick. Put it into permanent guides, though. Many a small valve has been ruined by swinging an extension off the center line and walking in a circle. That's like putting a 3 ft handwheel on the valve." Mac got up and started toward the door.

Install a Hammer Blow?

"I've got an idea, Mac," said John. "Why not put a hammer blow device on that big gear?"

"Because," replied Mac, "that would be like hitting one of those gear teeth with a hammer."

"But you said that in a motor operator you build in a hammer blow." John was puzzled.

"That's right, but don't forget that worm gears are used with a high starting torque motor. That motor is going full speed when the hammer blow comes into action. The worm can take the blow where a straight gear tooth would not take it more than a few times. Ideas are all right, John, but it takes engineering to make them practical." Mac started to move toward the door again. John got up and walked along with his friend.

"Mac, I surely do thank you for showing me a practical way of avoiding that climb — one that I can afford, too. Thanks a lot." He shook Mac's hand and they parted.

Contractor Questions City Ordinance

IN BUCKING a city ordinance it would appear, as announced by the court in a recent decision that "the advisability of such a provision be fought out with the city council." The Equable Heating Co. [the name is fictitious] in the case cited took a different course. It did the work and then decided to attack in the courts what it considered an unjust city inspired clause.

Ordinances of Equable's city provide that only "licensed installers" may install heating systems, and that such licensees must obtain a separate permit for each heating installation—if the space to be heated exceeds 100,000 cu ft. Pursuant to these ordinances, Equable Heating applied for a permit covering an installation which involved more than 100,000 cu ft and then submitted its plans to the building inspector. The plans conformed to all requirements of the permit ordinance—except in one particular. The plans were not "prepared and signed by a registered professional engineer duly qualified by registration as required by state law." For this sole reason the building inspector refused to issue the permit. Nevertheless, Equable proceeded with the installation. Convicted in municipal court of violating a city ordinance, the company appealed to the state supreme court.

The higher tribunal took the appeal very seriously. Facts being undisputed, the defendant contractor had urged in municipal court that certain provisions of the permit ordinance were unreasonable and unconstitutional. The prosecution had contended that Equable by accepting a city license thereby bound itself to obey the ordinance's provisions—and could not question their reasonableness or constitutionality.

The supreme court conceded that where a city's authority to enact a certain regulation is by its *terms general*, any ordinance pursuant thereto must be a reasonable exercise of that power and must not conflict with state or federal constitutions or law. Furthermore, since the action involved the possibility of Equable's losing liberty or property, it was "quite proper" for it to defend the action on constitutional grounds. As an added concession to Equable, the chief justice was unimpressed by the prosecution's contention that by mere acceptance of a license the heating company ratified all its provisions. He cited a relevant opinion of the U.S. Supreme Court:

"The acceptance of a license, in whatever form, will not impose upon the licensee an obligation to respect or comply with any provisions of the statute that are repugnant to the Constitution of the U. S. If licensee should refuse to comply with provisions or regulations 'inconsistent' with such Constitution, then the licensee's rights could be protected and enforced by appropriate judicial proceedings."

However, the court saw the whole case as hinging upon Equable's contention that the "registered professional engineer" provision in the ordinance was unreasonable and unconstitutional. Equable did not question the authority of the city council to pass a permit ordinance concerning the installation of heating equipment, nor did it question the requirement that plans be submitted. Nevertheless, the contractor maintained that since the ordinance was "very complete in detailed mechanical requirements and specifications of installation and construction", it was unreasonable to further specify that only registered professional engineers could prepare the plans. It was Equable's position that if plans met all standards, as determined by the city building inspector's office, nothing more could be accomplished by this additional requirement.

Before passing on Equable's contentions, the court defined a *practicing professional engineer* as set forth in law:

"Any person shall be deemed to be practicing professional engineering . . . who shall furnish any technical professional service, such as planning, designing or supervision of construction for the purpose of assuring compliance with any public or private structure . . . wherein the public welfare or the safeguarding of life, health or property is concerned . . . when such professional service requires the application of mathematics and the physical sciences, acquired by education and training."

The court reasoned that since a heating installation involves the safeguarding of life, health and property, there is a statutory requirement that anyone who prepares plans for a heating installation, public or private, must be a registered engineer—except in limited cases. "Thus it appears", ruled the court, "that the challenged provision of the ordinance is merely declaratory of a statutory requirement." The state statute specifically exempts certain installations from this category including one and two family dwellings and installations in non-public buildings costing not over $10,000.

Holding the city ordinance "reasonable and constitutional", the tribunal affirmed the municipal court's

[*Concluded on page* 179]

William Hurd Hillyer, author of this article, is a contributor to a number of banking and financial publications and has written several books on business. A former vice president of the Atlanta Trust Co., his work there gave him a practical legal background.

QUESTION OF THE MONTH

How To Protect Cooling Coils Against Freeze-Ups

- *IF YOU DON'T HAVE the answer to a heating, piping or air conditioning problem, chances are someone else does — or can be helpful on part of it. That's the reason for HPAC's Question of the Month "idea exchange."*

- *YOU ARE INVITED to contribute a question for publication, or an answer to a published question. Please address your reply to the Editors, Heating, Piping & Air Conditioning, 6 N. Michigan Ave., Chicago 2.*

- *IN A RECENTLY published question, "J. W." asked for suggestions on protecting air conditioning coils against freeze-ups, as a damaged coil in one of his buildings cost $4500 to replace. The following comments supplement those in reply to the same question which appeared in the December HPAC.*

A. V. THEADO —

"We Have Had a Similar Experience"

WE HAVE HAD an experience with freeze-ups of air conditioning coils, such as "J. W." inquired about in his question in the November HPAC.

Several tubes in the chilled water coils in the primary air supply of our air conditioning system froze and burst, even though the coils had been drained and a gallon of permanent anti-freeze had been poured through each coil section.

To replace the two lower coil sections that were damaged would have entailed an expense approximating that mentioned by "J. W." We were quite fortunate that we were able to braze the burst tubes without removing the coils with a low temperature welding alloy. An excellent job of welding was performed, and the sections have been in use for over a year and a half without a leak.

We now circulate a zero degree anti-freeze solution through each of the four sections for several minutes in order to be assured that a positive mixture of water and anti-freeze remains in the tubes after draining them. As additional protection, a mercury switch temperature controller has been installed on the upstream side of the coil that stops the air supply fans and closes the outside air damper when the temperature of the air passing over the coils drops to approximately 40 F.

If the steam pressure should drop sufficiently in the heating coil to permit a flow of cold air through the water coil, we feel they are adequately protected. Also, the stopping of the fans will prevent freezing of the lower sections of the steam coils if extremely low outside temperatures should exist at the same time. — A. V. THEADO, Head Operating Engineer, Farm Bureau Insurance Cos.

O. L. SMITH —

"Other Types of Systems Also Need Protection"

IN ANSWER TO "J. W.'s" question published in HPAC, How Should We Protect Against Freeze-Ups of Air Conditioning Coils?, there are several types of air conditioning circulating systems which use water as the heat transfer medium. The water circulating systems are what our thoughts go to when we first see or hear the word "freeze-ups." Let us not forget though, that brine systems also will freeze up if the solution becomes too weak.

The safety factor in a brine circulating system is the constant and regular check on the strength of the solution. One of the most commonly-used safety devices is the back pressure regulating valve, installed in the suction line just off of the evaporator. The back pressure regulator valve is installed with the setting designed for the job; however, there should always be a line gage at the inlet and outlet of the valve.

Although back pressure control valves may be used either with float

Reader Asks —

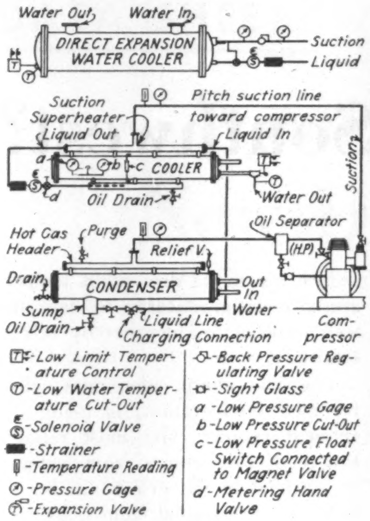
"Should We Use Unit Heaters for Cooling One of Our Buildings?"

"An area 60 ft by 180 ft by 15 ft in one of our buildings across the street from our new home office building is heated with low pressure steam unit heaters. The new building is completely air conditioned both summer and winter. Have any of HPAC's readers had any experience or information as to the practical use of these unit heaters for cooling by circulating 40 F water through them?

"Of course, considerable revamping of the piping will be required to make these units interchangeable for summer cooling and winter heating. Will the cooling capacity of these unit heaters, rated at approximately 150,000 Btu at 2 lb steam pressure, warrant the expense of connecting the chilled water to them?

"There is a pipe trench between the two buildings in which the steam supply and return for this building are now located."—A.V.T.

[You are invited to comment on this question, giving actual examples if possible. Address the Editors, Heating, Piping & Air Conditioning, 6 N. Michigan Ave., Chicago 2].


Water Out
Water In
DIRECT EXPANSION WATER COOLER
Suction
Liquid
Suction Superheater
Liquid Out
Pitch suction line toward compressor
Liquid In
a
b
c
COOLER
d
Oil Drain
Water Out
Suction
Oil Separator
Hot Gas Header
Purge
Relief V.
(H.P.)
Drain
CONDENSER
Out
In
Water
Sump
Oil Drain
Liquid Line
Charging Connection
Com-pressor
T -Low Limit Temperature Control
T -Low Water Temperature Cut-Out
S -Solenoid Valve
-Strainer
-Temperature Reading
-Pressure Gage
-Expansion Valve
-Back Pressure Regulating Valve
-Sight Glass
a -Low Pressure Gage
b -Low Pressure Cut-Out
c -Low Pressure Float Switch Connected to Magnet Valve
d -Metering Hand Valve

HOOK-UP RECOMMENDED by Mr. Smith for a direct expansion water cooler

expansion valves in flooded systems or with thermal expansion valves in dry systems, they should not be used with constant pressure expansion valves.

Another protection that should always be applied to the water circulating systems is the low temperature control with an inserted bulb at the lowest spot where the water comes out of the evaporator. Caution should be taken not to place this control too close to the bypass water. Many circulating systems have a mixing valve which mixes the returning water with cooled water to give the desired temperature.

The installation of safety controls in a system does not mean it cannot freeze up. The service on systems should be performed by those with knowledge of the system and experience with air conditioning and refrigeration. One recent and pertinent example emphasizing this is that of a service man who was pumping out the refrigerant to fix an oil leak by holding in the starter contacts — he was bypassing all safety controls. As a result, a third of the tubes had to be replaced. If there had been a back pressure regulating valve on the job, this cost could have been averted.

Freeze-ups occur in dry expansion coils also. Recently, I came on a job where two 7½ ton package units were installed in series with one common return and supply. In this case, the freeze-up would happen when one system would cut off and the air would re-cycle through the off unit. To correct the situation, dampers should be installed in each unit at the discharge or return side of the system. Such dampers should open when the system comes on and close when the power is off. — O. L. SMITH.

John W. James —

"Control Pump from Water Level To Improve Boiler Operation"

IN HIS QUESTION published in the December HPAC, "H.E." asked about the value of the "Hartford loop" connection for heating boilers, particularly in a close gravity wet return steam system with three oil fired boilers.

In the recorded history of the development of the "Hartford loop" or the "Hartford water line return," which was originally suggested about 1920, the primary purpose of the hook-up seemed to be to prevent water from falling below a safe operating level in the boiler. It was recognized that loss of water from a boiler due to a break or leak in the return piping, or because water of condensation failed to return to the boiler as promptly as required, could be prevented by arranging a balancing or equalizing pipe between the steam riser from the boiler and the return, with the condensate return connection through a "Y" fitting to the equalizing piping at a point approximately 2 in. below the safe operating level of the boiler.

Before the Hartford loop was generally accepted, it was common practice to use a check valve in the return piping to the boiler, and because these valves were not entirely reliable in operation, it was concluded that the Hartford water line return arrangement could provide a safer boiler operating condition. Although the Hartford water line return is of the greatest advantage when the condensate return to the boiler is by gravity, it may be used with pump return systems, and therefore is considered suitable for closed gravity wet return systems, as well as other accepted condensate return arrangements.

Multiple Installations

When multiple installations of oil fired boilers of equal capacity are arranged with Hartford water line return piping, it is a common conception that the water line in all boilers will be uniformly maintained, but from practical field experience this ideal objective is not often realized due to many reasons. A full discussion of this problem was presented in the writer's article, Control Pump from Water Level to Improve Boiler Operation, which appeared in the December 1950 HPAC. Diagrams were included in this article illustrating a method of using individual water line control on each boiler for starting and stopping the operation of a single boiler feed pump with electrically operated valves installed on the feed line to each boiler. With this arrangement of controlling the water line through boiler feed pump operation, the objective of starting successive oil burners as the heating load increases can easily be achieved.—JOHN W. JAMES, Vice President, McDonnell & Miller, Inc.

THE LAW —

[*Concluded from page* 177]

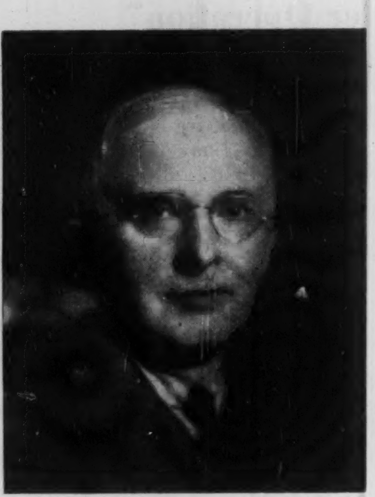
decision and the heating company stood convicted. Since the question of constitutionality was not argued by either side, it was not passed on in the decision.

The supreme court went on to say: "The inherent dangers in the operation of any heating plant make it necessary that the *plans and specifications* of such equipment be *faultless*. . . . The minimum qualifications necessary for registration would seem to indicate that work prepared by persons thus equipped would be more likely to possess these virtues. There is no delegation of authority to these engineers as the appellant (Equable) contends. They are required merely to prepare the plans, not to pass on the conformity of the installation to the requirements of the ordinance."

[Note: While this discussion applies to an actual case, it should be remembered that legal rules vary in different states.]

SAM LEWIS' PAGE

Is Engineering Moving Southwest?



SAMUEL R. LEWIS, well-known consulting mechanical engineer and a member of HPAC's board of consulting and contributing editors, comments informally each month on heating, piping and air conditioning matters, devotes his "Page" this time to a number of observations.

IS THE SCIENTIFIC engineering center of the United States moving southwest?

• One is inclined to think so when reading the advertising of manufacturers in the western part of the United States emphasizing recent engineering achievements. This southwest engineering research may have followed the opening of Nature's store of oil and gas, but also is influenced by the airplane industry.

One who reads scientific magazines must sometimes think that the mechanical engineering center of our culture has migrated to Texas and California and thereabouts.

• The two steam piston engines that are part of the now-practically-orphaned steam locomotive and that must be kept out of synchronism lest they lock on a dead center, have been superseded by the diesel locomotive. The diesel has continuous transmission through its electric generator-motor, even though the diesel engine itself still remains reciprocating.

In refrigeration for air conditioning, few of the old reciprocating steam engine drives remain. We still have some installations of this type however, at the Chicago stockyards meat packing plants.

Apparently, there are some newly improved refrigerant gasses that can be compressed effectively in a centrifugal machine at rotative speeds very much less rapid than generally has been thought necessary. I observe also, improved utilization of a combination pneumatic-electric sequence control for the various functions of a refrigeration-condensing apparatus.

• Electricity, when teamed up with compressed air, gives us simple and reliable fail-safe control equipment. It is easy to arrange for electric energy in a control circuit, to affect a compressed air orifice that will pass the air along to operate a valve or damper. If through some failure, or by intention, the compressed air is not on the job, the valve or damper must assume the fail-safe position positively by the action of permanent springs or their equivalent.

• Many boiler makers are now building a scotch type fire tube boiler. The earlier ratings published for some of these boilers per unit of heating surface were too enthusiastic, and —while doubtless honest—have become more conservative and dependable.

I have found it possible to increase the capacity of several types of steam boilers by adding pumps that induce mechanical circulation of the water inside the boiler.

• In designing large air conditioning systems, I find a constant advantage in maintenance, flexibility and safety by employing water. Frequently, when water pumped from wells is not quite cold enough to reduce air to its dew point temperature, it is practicable to cool the well water a few degrees by refrigeration.

The heat pump, sometimes called reversed refrigeration, is being developed rapidly. Its most reliable source of heat comes from water—as warmed in the ground in buried pipes, or as pumped from wells.

Urges Greater Role in Public Life for Engineers

GWILYM A. PRICE, president of the Westinghouse Electric Corp., recently called on the nation's engineers to play a greater role in public life and to take the lead in "applying engineering principles to our social problems." Addressing the annual dinner of the American Society of Mechanical Engineers in New York City, he said "the engineer is not only the ideal man for this work, but also stands in an ideal position to perform it." Yet, he added, in the past the engineer has "tended to stay clear of such commitment."

Of the 48 governors, he pointed out, none is an engineer, while only two of the 96 United States senators are of the engineering profession.

Wherever the nation's problems are physical and subject to technical solutions, they have been and can be surmounted, Mr. Price declared, adding: "Unhappily, however, many of our most dangerous problems are not physical and will not be solved by better research, high productivity, or any of the other industrial virtues. I refer to the social illnesses that afflict our age. How to cope with these is probably the most perplexing internal problem we face.

"You and other engineers hold part of the answer in your hands," he told his audience. "You have successfully applied engineering principles to industry. Now our hope lies in part in the application of those principles to our social problems."

DATA SHEET

Weather Bureau Issues New Degree Day Normals

THESE NEW NORMAL degree day figures are based on U. S. Weather Bureau records for the 30 year period 1921 to 1950, inclusive.

They are computed on the standard 65 F base.

Further information about them was given on page 133 of the November HPAC, where the figures for Alabama — Illinois were published. The data for Indiana — New Mexico appeared in the December HPAC.

NEW NORMAL DEGREE DAY figures, monthly and seasonal
AP indicates airport station, CO city office station

Station	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Annual
NEW YORK													
Albany AP	1318	1179	989	597	246	50	0	24	139	443	780	1197	6962
Albany CO	1234	1103	905	531	202	31	0	6	98	388	708	1113	6319
Bear Mountain CO	1212	1098	921	561	244	59	0	25	119	409	753	1110	6511
Binghamton AP	1342	1215	1051	672	318	88	16	63	192	518	834	1228	7537
Binghamton CO	1218	1100	927	570	240	48	0	36	141	428	735	1113	6556
Buffalo AP	1225	1128	992	636	315	72	16	30	122	433	753	1116	6838
New York La Guardia AP	992	907	760	447	141	10	0	0	28	250	546	908	4989
New York CO	995	904	753	456	153	18	0	0	39	263	561	908	5050
New York Central Park Obs.	1001	910	747	435	130	7	0	0	31	250	552	902	4965
Oswego CO	1249	1134	995	654	355	90	20	39	139	430	738	1132	6975
Rochester AP	1249	1148	992	615	289	54	9	34	133	440	759	1141	6863
Schenectady CO Coop.	1349	1207	1008	597	233	40	0	19	137	456	792	1212	7050
Syracuse AP	1225	1117	955	570	247	37	0	29	117	396	714	1113	6520
NORTH CAROLINA													
Asheville CO	794	678	572	285	105	5	0	0	50	262	552	769	4072
Charlotte AP	704	577	449	172	29	0	0	0	7	147	438	682	3205
Greensboro AP	806	672	528	241	50	0	0	0	29	202	510	772	3810
Hatteras CO	527	487	394	171	25	0	0	0	0	63	244	481	2392
Raleigh AP	732	613	477	202	41	0	0	0	16	149	438	701	3369
Raleigh CO	691	577	440	172	29	0	0	0	10	118	387	651	3075
Wilmington AP	533	463	347	104	7	0	0	0	0	73	288	508	2323
Winston-Salem AP	797	666	519	232	49	0	0	0	28	182	492	756	3721
NORTH DAKOTA													
Bismarck AP	1730	1464	1187	657	355	116	29	37	227	598	1098	1535	9033
Devils Lake CO	1866	1576	1314	750	394	137	47	61	276	654	1197	1668	9940
Fargo AP	1795	1518	1231	687	338	101	25	41	215	586	1122	1615	9274
Williston CO	1705	1442	1194	663	360	138	29	42	261	605	1101	1528	9068
OHIO													
Akron-Canton AP	1166	1033	884	537	235	50	0	17	83	378	738	1082	6203
Cincinnati AP	1029	871	732	392	149	23	0	6	77	295	648	973	5195
Cincinnati CO	942	812	645	314	108	0	0	0	42	222	567	880	4532
Cincinnati ABBE OBS.	989	846	682	347	132	13	0	0	56	263	612	930	4870
Cleveland AP	1132	1019	874	531	223	46	0	10	75	340	699	1057	6006
Cleveland CO	1101	977	846	510	223	49	0	9	60	311	636	995	5717
Columbus AP	1094	946	781	444	180	31	0	8	69	337	693	1032	5615
Columbus CO	1051	907	741	408	153	22	0	0	59	299	654	983	5277
Dayton AP	1094	941	781	435	179	39	0	5	74	324	693	1032	5597
Sandusky CO	1122	997	853	513	217	41	0	0	66	327	684	1039	5859
Toledo AP	1197	1056	905	555	245	60	0	12	102	387	756	1119	6394
Youngstown AP	1163	1030	877	534	241	53	0	19	83	355	732	1085	6172
OKLAHOMA													
Oklahoma City AP	865	650	490	182	40	0	0	0	14	154	480	769	3644
Oklahoma City CO	843	630	472	169	38	0	0	0	12	149	459	747	3519
Tulsa AP	856	644	485	173	44	0	0	0	18	152	462	750	3584
OREGON													
Astoria AP	772	613	611	459	357	222	138	111	146	338	537	691	4995
Baker CO	1268	972	837	591	384	200	25	47	255	518	852	1138	7087
Burns CO	1274	946	809	552	349	159	10	37	219	552	855	1156	6918
Eugene AP	831	624	567	423	270	125	33	34	144	381	591	756	4779
Meacham AP	1243	1008	961	717	527	327	88	102	294	605	903	1113	7888

NEW NORMAL DEGREE DAY figures, monthly and seasonal

AP indicates airport station, CO city office station

Station	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Annual
OREGON (Continued)													
Medford AP	862	627	552	381	207	69	0	0	77	326	624	822	4547
Pendleton AP	1066	795	614	386	197	51	0	0	104	353	717	921	5204
Portland AP	856	658	570	396	242	93	25	22	116	319	585	750	4632
Portland CO	791	594	515	347	199	70	13	14	85	280	534	701	4143
Roseburg CO	744	563	508	366	223	83	14	10	98	288	531	694	4122
Salem AP	825	622	564	408	249	91	21	23	113	326	588	744	4574
Sexton Summit	905	801	797	621	450	270	88	69	169	456	714	877	6217
Troutdale AP	874	664	574	405	256	115	33	31	131	335	591	766	4775
PENNSYLVANIA													
Allentown AP	1132	1019	840	495	164	25	0	9	89	366	690	1051	5880
Erie CO	1123	1039	911	573	273	55	0	17	76	352	672	1020	6116
Harrisburg AP	1051	921	750	423	128	14	0	0	69	308	630	964	5258
Park Place CO	1277	1142	998	648	290	85	14	57	173	484	807	1200	7175
Philadelphia AP	986	879	704	402	104	0	0	0	47	269	573	902	4866
Philadelphia CO	933	837	667	369	93	0	0	0	33	219	516	856	4523
Pittsburgh Allegheny AP	1073	955	784	447	167	27	0	6	78	336	678	1004	5555
Pittsburgh Grtr Pitt. AP	1116	986	818	486	195	36	0	20	94	377	720	1057	5905
Pittsburgh CO	992	879	735	402	137	13	0	0	56	298	612	924	5048
Reading CO	1017	902	725	411	123	11	0	5	57	285	588	936	5060
Scranton CO	1141	1028	859	516	196	35	0	18	115	389	693	1057	6047
Williamsport AP	1132	1005	828	477	181	25	0	16	101	377	699	1057	5898
RHODE ISLAND													
Block Island AP	1026	955	865	603	335	96	6	21	88	330	591	927	5843
Providence AP	1125	1019	874	570	258	58	0	26	107	381	672	1035	6125
Providence CO	1076	972	809	507	197	31	0	7	68	330	624	986	5607
SOUTH CAROLINA													
Charleston AP	472	379	281	63	0	0	0	0	0	52	270	456	1973
Charleston CO	445	363	260	43	0	0	0	0	0	34	214	410	1769
Columbia AP	566	468	340	83	0	0	0	0	0	82	338	558	2435
Columbia CO	538	443	318	77	0	0	0	0	0	76	308	524	2284
Florence AP	588	487	334	83	0	0	0	0	0	94	347	574	2507
Greenville AP	673	552	442	161	32	0	0	0	10	131	411	648	3060
Spartanburg AP	670	549	436	152	26	0	0	0	7	136	414	654	3044
SOUTH DAKOTA													
Huron AP	1597	1327	1032	558	279	80	10	16	149	472	975	1407	7902
Rapid City AP	1361	1151	1045	615	357	148	32	24	193	500	891	1218	7535
Sioux Falls AP	1575	1274	1023	558	276	80	16	21	155	472	984	1414	7848
TENNESSEE													
Bristol AP	818	697	576	274	95	0	0	0	58	239	576	815	4148
Chattanooga AP	725	588	467	179	45	0	0	0	24	169	477	710	3384
Knoxville AP	760	630	500	196	50	0	0	0	33	179	498	744	3590
Memphis AP	725	574	427	139	24	0	0	0	17	126	432	673	3137
Memphis CO	716	574	423	131	20	0	0	0	13	98	392	639	3006
Nashville AP	778	636	498	186	43	0	0	0	22	154	471	725	3513
TEXAS													
Abilene AP	673	479	344	113	0	0	0	0	5	98	350	595	2657
Amarillo AP	921	711	586	298	99	0	0	0	37	240	594	859	4345
Austin AP	484	322	211	50	0	0	0	0	0	30	214	402	1713
Big Springs AP	639	454	314	105	0	0	0	0	0	75	316	577	2480
Brownsville AP	219	106	74	0	0	0	0	0	0	0	59	159	617
Corpus Christi AP	330	192	118	6	0	0	0	0	0	0	113	252	1011
Dallas AP	607	432	288	75	0	0	0	0	0	53	299	518	2272
Del Rio AP	419	235	147	21	0	0	0	0	0	26	188	371	1407
El Paso AP	670	445	330	110	0	0	0	0	0	70	390	626	2641
Fort Worth AP	622	446	308	90	5	0	0	0	0	58	299	533	2361
Fort Worth Amon Carter Fld.	619	432	326	81	0	0	0	0	0	57	299	524	2338
Galveston AP	362	249	176	28	0	0	0	0	0	0	132	286	1233
Galveston CO	356	247	176	30	0	0	0	0	0	0	131	271	1211
Houston AP	394	265	184	36	0	0	0	0	0	7	181	321	1388
Houston CO	378	240	166	27	0	0	0	0	0	0	162	303	1276
Laredo AP	270	134	71	0	0	0	0	0	0	0	91	215	781
Lubbock AP	812	613	481	201	36	0	0	0	23	173	492	756	3587
Palestine CO	531	368	265	71	0	0	0	0	0	45	260	440	1980
Port Arthur AP	406	274	211	39	0	0	0	0	0	20	218	349	1517
Port Arthur CO	381	258	181	27	0	0	0	0	0	8	170	315	1340
San Angelo AP	556	378	257	62	0	0	0	0	0	72	280	502	2107
San Antonio AP	462	293	190	34	0	0	0	0	0	25	201	374	1579
Victoria AP	352	209	143	14	0	0	0	0	0	0	131	277	1126
Waco AP	557	385	263	66	0	0	0	0	0	44	251	459	2025
Wichita Falls AP	756	538	394	140	16	0	0	0	5	115	404	657	3025

This tabulation will be continued next month.

Heating, Piping & Air Conditioning

THE AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS

JOURNAL SECTION

Heat Flow Characteristics of Hot Water Floor Panels

By E. L. Sartain* and W. S. Harris,** Urbana, Ill.

SUMMARY — Few recent developments in heating methods have enjoyed the rapid acceptance by the public as has panel heating. Its growth has been so fast that research has lagged behind with installations being made even though much information concerning the design and operation of these systems is lacking.

In 1948 the ASHVE started a comprehensive research program which is still being continued and which is filling in many of the gaps in our knowledge of panel heating. In 1951 the *Institute of Boiler and Radiator Manufacturers* agreed to include panel heating in the steam and water heating research program now being sponsored at the University of Illinois Engineering Experiment Station, providing the work would not duplicate that being done by the ASHVE. While the *I = B = R* panel heating research project is not officially a part of the ASHVE program, it has been the policy to submit both the proposed research outlines and results obtained to the ASHVE Technical Advisory Committee on Panel Heating and Cooling.

This paper contains a discussion of results of tests made on a floor panel heating system installed in the Floor Slab Laboratory at the University of Illinois. It is not intended to be a complete report of the panel heating investigation. Rather, it is confined primarily to a discussion of findings regarding heat exchanges between the panel and its surroundings and the effectiveness of several methods of insulating the panel in reducing reverse losses.

The heating panels consisted of serpentine coils of ¾-in. black iron pipe laid on 12-in. centers in a 4-in. concrete floor slab. Two inches of concrete covered the coils. There were four test rooms, all of the same size, but with different amounts of glass area. Three types of floor insulation were used.

Description of Equipment

Floor Slab Laboratory: The Floor Slab Laboratory, shown in Figs. 1 and 2, was constructed in 1947 for the specific purpose of studying methods of insulating unheated concrete floor slabs[1]. The one-story building was modified in 1949 and 1950 to accommodate concrete floor slabs with embedded warm-air perimeter heating ducts[2]. In 1951 the building was modified again to facilitate the investigation of hot-water panel heating using ¾-in. welded steel pipe embedded in concrete floor slabs and nominal ⅜-in. copper tube embedded in the plaster ceilings. Rooms A, B, and C were exposed only to the north while Room D had both a north and an east exposure; thus, the effect of solar radiation was minimized. Rooms A and B had one window each with an area equal to 10 percent of the floor area, while Rooms C and D each had two such windows. All windows were located in the north wall. A summary of the overall heat transfer coefficients and design heat losses for each room is given in Table 1. The walls between rooms were thoroughly insulated to minimize any heat transfer between adjoining spaces. The test room floors were separated by 6 in. of cellular glass insulation which extended from the floor surface into the ground to a depth of 4 ft. The insulation between the corridor and test room floors extended to a depth of 2 ft.

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[1] Temperature and Heat Loss Characteristics of Concrete Floors Laid on the Ground, by H. A. Bareither, A. N. Fleming, and B. E. Alberty (*American Artisan,* Vol. 87, No. 3, March 1950).

For presentation at the 60th Annual Meeting of THE AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, Houston, Tex., January 1954.

[2] Heat Emission Characteristics of Warm Air Perimeter Heating Ducts, by J. R. Jamieson, R. W. Roose, H. T. Gilkey, and S. Konzo (University of Illinois Engineering Experiment Station *Bulletin* No. 412).

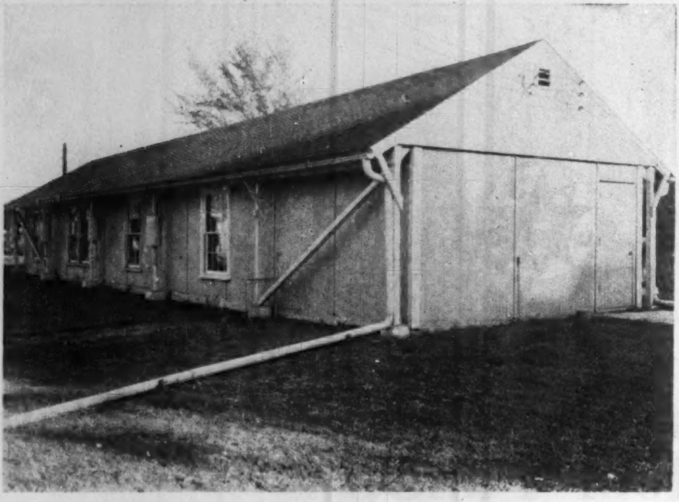

Fig. 1 — Floor slab laboratory

The three methods of insulating the floor slabs studied in this investigation are shown in Fig. 3. The insulation used consisted of cellular glass, having a thermal conductivity of 0.42 Btu per (hr) (sq ft) (F) (in. of thickness). A 4-in. layer of coarse gravel under the floor provided suitable drainage and minimized the capillary rise of moisture from the soil. A duplex kraft paper was placed over the gravel fill for a membrane dampproofing. All the joints were lapped and then sealed with cold tar. The soil under and adjacent to the Laboratory contained 3 ft of fill which was primarily a silty clay composed of approximately 18 percent clay, 53 percent silt, 24 percent sand, and 5 percent gravel over approximately 1 ft of the original black silty clay top soil. The normal grade level around the building was 8 in. below the finished floor and sloped away from the building for proper drainage.

Heating System: A hot-water, floor panel heating system was installed in each test room. The panels were designed in accordance with the *I=B=R* Installation Guide No. 6 and consisted of ¾-in. welded steel pipe on 12-in. centers so located that the top of the pipe was 2 in. below the surface of the floor. In order to vary the output of the panel in conformity with the design heat loss of the room, various portions of the total coil length were by-passed by means of an arrangement of valves. The next to the last line of Table 1 shows the required panel area in each room based on a heat emission rate of 50 Btu per (hr) (sq ft). The last line gives the active panel area used during the tests reported in this paper. In each room hot water from the heater was supplied to the panel at the outside wall. Each test room was provided with its own electric water heater, watt-hour meter, circulating pump, necessary piping, and control system. A schematic diagram of the heating system is shown in Fig. 2.

Instrumentation: Complete instrumentation for temperature measurement was provided, consisting of approximately 600 copper constantan thermocouples which were used to measure the temperatures of room air, heated and unheated room surfaces, attic air, outdoor air, and water in the system. Along the center line of each room perpendicular to the north wall a large number of thermocouples were placed in the ground and on the under surface of the concrete slab. In addition, under and to the north of Room B, thermocouples were placed in the ground to a maximum depth of 20 ft (see Fig. 3).

Forty-four heat flow meters of the type constructed at the ASHVE Research Laboratory[3], made and calibrated at the University of Illinois, were installed both on the top surface of the concrete floor slabs and under the gravel fill. Ten commercial heat flow meters were installed at the edges of the floor slabs in order to determine edge losses. Instruments were also provided to measure the relative humidity, electrical input to the immersion heaters and control circuits, water flow rates, and level of the water table under the building. Continuous records of the more important temperatures and heat flow rates were obtained by the use of two recording potentiometers.

Auxiliary equipment included exhaust fans, heaters, and thermostatic controls for the attic, ventilating fans in the corridor, and thermostatically controlled convection heaters in the corridor and instrument room.

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[3] A Low-Inertia Low-Resistance Heat Flow Meter, by R. G. Huebscher, L. F. Schutrum, and G. V. Parmelee (ASHVE JOURNAL SECTION, *Heating Piping & Air Conditioning*, May 1952, p. 111).

Table 1—Heat Loss Data

(Based on Indoor Temperature of 70 F, Outdoor Temperature of −10 F)

Item	Thermal Conductance, Btu per (hr) (sq ft) (F)	Design Heat Loss, Btu/hr			
		Room A	Room B	Room C	Room D
Surface					
Floor	0.69[a]	800	800	800	1,450
Walls	0.16	1,230	1,230	970	2,160
Ceiling	0.08	1,080	1,080	1,080	1,080
Windows	1.13	1,810	1,810	3,620	3,620
Infiltration	0.61[b]	1,100	1,100	1,100	1,100
Total Heat loss		6,020	6,020	7,570	9,410
Panel Area Required, sq ft		120	120	151	188
Panel Area Used, sq ft		116	116	145	169

[a] Btu per hr per lin ft of exposed edge
[b] Air changes per hr

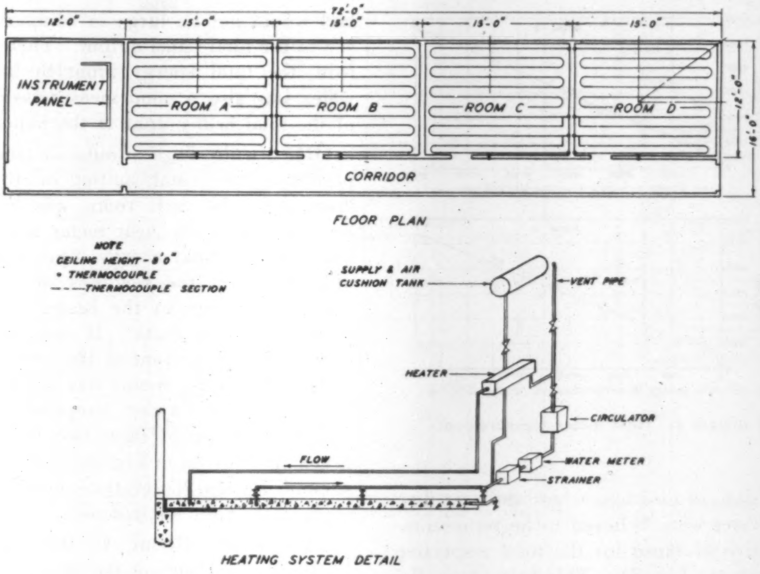

72'-0"
12'-0"
15'-0"
15'-0"
15'-0"
15'-0"
INSTRUMENT PANEL
ROOM A
ROOM B
ROOM C
ROOM D
12'-0"
16'-0"
CORRIDOR
FLOOR PLAN
NOTE
CEILING HEIGHT - 8'0"
• THERMOCOUPLE
----THERMOCOUPLE SECTION
SUPPLY & AIR CUSHION TANK
VENT PIPE
HEATER
CIRCULATOR
FLOW
WATER METER
STRAINER
HEATING SYSTEM DETAIL

Fig. 2 — Floor plan and heating system detail

Table 2—Room-Air and Wall-Surface Temperatures
(Average Outdoor Temperature 26.7 F)

Distance Above Floor Inches	Room-Air Temperatures (F) Center of Room			
	Room A	Room B	Room C	Room D
3	71.2	71.9	72.3	72.5
12	71.2	71.8	72.6	72.6
30	71.2	71.9	72.8	73.0
60	71.6	72.1	72.3	73.1
84	71.7	72.2	72.3	73.2
93	71.0	72.0	72.3	73.2

Distance Above Floor Inches	Wall Surface Temperatures (F) — Room A			
	South Wall	North Wall	East Wall	West Wall
3	71.8	70.0	74.2	74.8
12	72.1	69.5	74.2	74.2
30	72.2	69.2	73.9	73.4
60	72.2	68.8	72.5	72.8
84	72.2	68.8	71.7	72.2
93	72.2	68.2	71.8	71.8

Note: Air temperatures obtained at the various levels 2 ft from the thermostat slightly higher than those obtained at center of the room.

Operating Conditions

For all of the tests discussed in this paper, each electric water heater was adjusted to a heat input rate equal to 1.3 times the estimated design heat loss of the room it served. This was to simulate the normal piping and pickup factor. The circulators were operated continuously, and the water heaters were turned on and off by means of thermostats in each room located 30 in. above the floor on an inside wall. During all tests reported in this paper, the thermostats were set to maintain a constant air temperature of 72 F at the 30-in. level. A high limit control was provided in each system and was adjusted to turn off the heater whenever the leaving water attained a temperature of approximately 130 F.

The corridor floor was maintained at the same temperature as that of the adjoining test room floor by manual regulation of the voltage of the supply to electric cables embedded in the corridor floor. The air in the corridor was kept at approximately the same temperature as that of the air in the test rooms by means of convection heaters thermostatically controlled. During all tests the temperature of the air in the attic was maintained at a constant value of 60 F by thermostatic control.

Complete thermocouple and meter readings for each room were taken every morning at approximately the same time, and the more important data were recorded over 24-hr periods.

Results

Room Conditions: Table 2 shows the room-air and wall-surface temperatures as observed when the average outdoor temperature was 26.7 F.

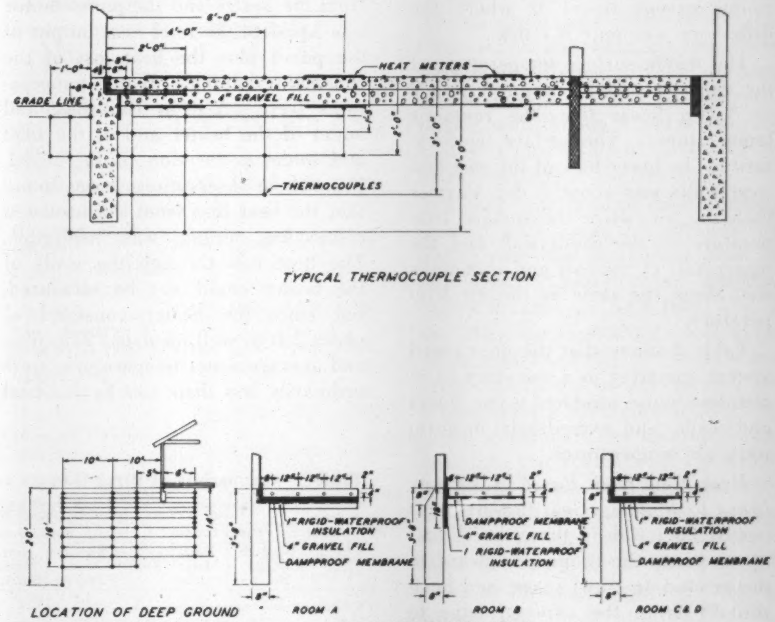

8'-0"
4'-0"
2'-0"
1'-0"
8"
6"
GRADE LINE
HEAT METERS
4" GRAVEL FILL
1'-0"
2'-0"
3'-0"
4'-0"
8"
THERMOCOUPLES
TYPICAL THERMOCOUPLE SECTION
10"
10"
5"
6"
20'
16'
14'
12"
2"
4"
3'-8"
8"
1" RIGID-WATERPROOF INSULATION
4" GRAVEL FILL
DAMPPROOF MEMBRANE
DAMPPROOF MEMBRANE
1 RIGID-WATERPROOF INSULATION
LOCATION OF DEEP GROUND SERIES THERMOCOUPLE
ROOM A
ROOM B
ROOM C & D
METHODS OF INSULATING TEST ROOM FLOORS

Fig. 3 — Instrumentation and floor insulation

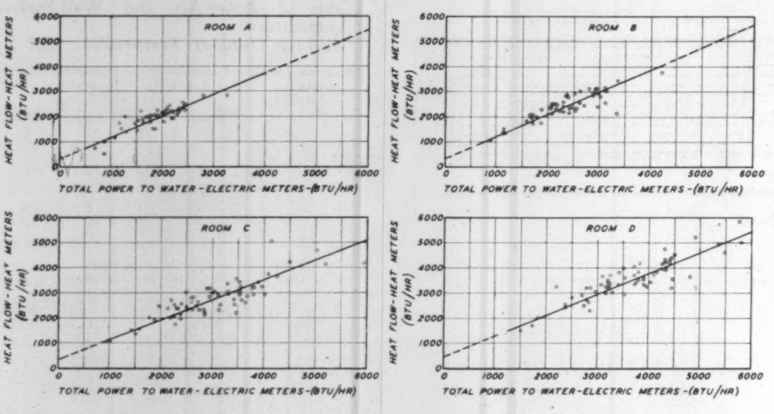


Fig. 4 — Btu output of panels — Electric meters *vs.* Heat meter measurements

This outdoor temperature is about 10 F lower than the average for the heating season at Urbana, Ill., and so the data are representative of operating results for the greater part of the winter.

The air temperatures at the center of the rooms were very uniform, with a variation between the floor and 60-in. level of 0.5 deg. The temperatures of the air 3 in. below the ceiling and 3 in. above the floor were practically the same in all rooms except Room D where the difference was only 0.7 deg.

The inside surface temperature of the exposed wall in Room A was 2 to 3 deg lower than the room-air temperatures. The surface temperature of the lower half of the east and west walls was about 2 deg warmer than the air, while the surface temperature of the south wall and the upper half of the east and west walls was about the same as the air temperature.

Table 2 shows that the floor panel system operating in a one-story basementless house produces warm floors and walls, and exceedingly uniform room-air temperatures.

Heat Flow from Panel vs. Energy Input to Water: Heat flows from a heated floor slab in three directions: upward into the room, downward to the ground or crawl space, and horizontally from the exposed edge to the outdoors. Heat meters were installed on the top surface, along the exposed edge and under each floor slab, in positions where the heat flow rates were believed to be representative of those for the total respective areas (Fig. 3). This being true, the total heat flow in any direction could be determined by multiplying the respective area by the average heat flow rate in that direction as determined by the heat flow meter. The total flow from the panel was the sum of the total flows in each of the three directions.

The energy input to the water from the heater and the pump motor was equal to the total heat output of the panel plus the heat loss of the connecting piping. Water temperatures were taken at the inlet and outlet of the heater and at the inlet and outlet connection to the panel. From these observations it was found that the heat loss from the insulated connecting piping was negligible. The heat loss through the walls of the heater could not be measured, but since the heater consisted of about 2 ft of well insulated 2-in. pipe and average water temperatures were ordinarily less than 130 F, this heat loss would not be large in comparison to the total panel output. Therefore, the total energy input to the water was also a good measurement of the total heat output of the panel.

Over a wide range of outdoor temperatures, the total output of the floor panel in each room was determined from the heat meter readings and the total energy input was obtained from the readings of the watt-hour meters in the heater and pump motor circuits. It was assumed that 60 percent of the energy input to the pump motor was utilized in raising the water temperature. The relationship of these two measurements is given in Fig. 4. Table 3 summarizes the observations made in each of the four test rooms.

Except for Room C the two methods of measuring the total heat output of the panel agreed within 10 percent.

Because of the lack of test points at high indoor-outdoor temperature differences, the curves for all rooms were extrapolated to design conditions. This extrapolation could account for part of the discrepancies at high indoor-outdoor temperature differences. One heat meter in Room C was located on the boundary of the active and inactive panel areas. This condition did not exist in other rooms. The heat output rate changed rapidly along this line and it is quite probable that the readings of this meter were not representative of the heat flow from the active panel area. The heat flow rate along this line was probably higher than that indicated by the heat meter. Had the meter been located within the active panel area in Room C, the heat meter and electric meter data would have been in better agreement.

Table 3—Comparison of Panel Outputs as Measured by Heat Meters and Electric Meters

Indoor-Outdoor Temp Diff F Deg	Room A			Room B			Room C			Room D		
	Panel Output			Panel Output			Panel Output			Panel Output		
	Watt-Hr Meter Btu/hr	Heat Meter Btu/hr	% Diff[b]	Watt-Hr Meter Btu/hr	Heat Meter Btu/hr	% Diff[b]	Watt-Hr Meter Btu/hr	Heat Meter Btu/hr	% Diff[b]	Watt-Hr Meter Btu/hr	Heat Meter Btu/hr	% Diff[b]
20	1250	1120	1.1	1330	1460	9.8	1450	1410	− 2.8	1800	1980	10.0
40	2220	2050	−0.3	2770	2790	0.7	3450	3050	−11.7	3980	3810	− 4.3
60	3200	2980	−6.4	4180	4060	−2.9	5400	4660	−13.7	6120	5600	− 8.5
80	4220[a]	3920[a]	−7.1	5580[a]	5350[a]	−4.1	7400[a]	6300[a]	−14.9	8350[a]	7500[a]	−10.2

[a] Extrapolated values. [b] Based on electric meter data.

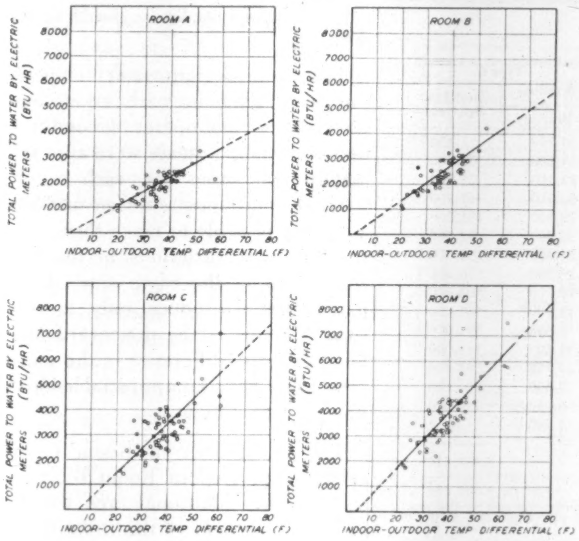


Fig. 5 — Total heat output of panels

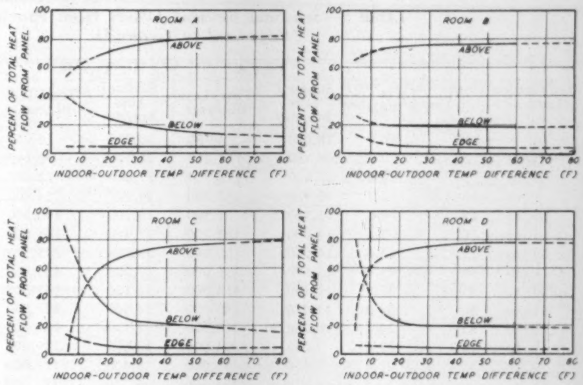


Fig. 6 — Percentage distribution of total panel output

In all the rooms, the heat flow as measured by the heat meters was consistently lower than the heat equivalent of the energy input to the electric heaters and work done by the pumps. A slight difference in this direction was to be expected since the energy input to the heaters included the small loss from the heater wall and from the piping between heater and panel. On the other hand, the heat meter readings of necessity covered only a small percentage of the total panel area. The assumption that the heat flow rate determined from this small sampling was representative of the total heat flow rate of the panel could result in inaccuracies. The fact that in practically every instance the agreement was within 10 percent for the two methods of measurement was considered as evidence that instrumentation was adequate. Since there appeared to be fewer chances of error in the measurements of heat flow based on the electrical input to the system, this method of measurement was used for the total heat flow, and the heat meter data were used to proportion the heat flow from the panel in each direction.

Distribution of Heat Flow from Panels: Fig. 5 shows the total heat flow from the panel of each room as measured by the electric meters in the pump motor and heater circuits. Fig. 6 shows the percentage distribution of the total heat flow in each direction from each of the panels as measured by the heat meters. These curves are all based on conditions of operation by which the rooms were maintained at a constant temperature of approximately 72 F at the 30-in. level at all times.

Table 4—Upward Heat Flow from Panels Compared with Calculated Heat Losses

Item	Room A	Room B	Room C	Room D
Calculated Above Floor Loss (Unheated Attic) (Btu/hr)	5,200	5,200	6,770	7,950
Calculated Above Floor Loss (Heated Attic) (Btu/hr)	4,300	4,300	5,850	7,040
Calculated Total Loss (Unheated Attic) (Btu/hr)	6,020	6,020	7,570	9,410
Calculated Total Loss (Heated Attic) (Btu/hr)	5,100	5,100	6,650	8,490
Total Heat Flow From Panel (Fig. 5)	4,580	5,600	7,400	8,350
Upward Heat Flow in Percent of Total (Fig. 6)	82	76	79.5	78.5
Measured Upward Heat Flow	3,760	4,260	5,880	6,550
Ratio of Total Heat Flow from Panel to Total Calculated Loss (Heated Attic)	0.90	1.10	1.11	0.99
Ratio of Upward Heat Flow to Above Floor Loss	0.87	0.99	1.01	0.93

Note: Calculated Losses based on: Indoor temperature = 70 F; Outdoor temperature = −10 F; Heated attic temperature = 60 F; Unheated attic temperature = −10 F.

From Fig. 6 it may be observed that for all indoor-outdoor temperature differences in excess of 30 deg the division of heat flow from the panels in all four rooms was about the same, with the useful heat into the room being 3 to 5 percent higher in Room A than in the other rooms. At indoor-outdoor temperature differences of less than 30 deg there were wide differences in the division of the heat flow from the different panels, with Rooms A and B showing a greater proportion of the total heat being supplied to the rooms.

Actual heat flow in any direction from a panel may be obtained by multiplying the total heat flow at any given indoor-outdoor temperature difference as read from Fig. 5 by the corresponding percentage value read from Fig. 6. Table 4 has been constructed in this manner for a temperature difference of 80 F in order to compare the measured heat flow into the rooms with the calculated heat losses. The total measured heat flow from the panels ranged from 90 percent of the total calculated heat loss of Room A to 111 percent of the calculated loss of Room C. The measured upward heat flow from the panels ranged from 87 percent of the calculated

Table 5—Seasonal Reverse Losses from Panels[a]
(Edge and to Ground)

Avg Outdoor Temp (F)	Avg No. Days Per Year	Type A		Type B		Type C	
		Subfloor Loss Btu/day	Total Loss Btu/year	Subfloor Loss Btu/day	Total Loss Btu/year	Subfloor Loss Btu/day	Total Loss Btu/year
−10 to −5	0.2	18,900	3,780	30,300	6,050	35,700	7,130
−5 to 0	0.4	18,130	7,250	28,400	11,350	34,200	13,680
0 to 5	0.8	17,200	13,750	27,000	21,600	32,100	25,700
5 to 10	2.2	16,420	36,200	24,900	54,800	30,500	67,200
10 to 15	4.6	15,550	71,500	23,100	106,300	28,500	131,200
15 to 20	7.6	14,900	113,200	21,450	163,000	26,400	202,000
20 to 25	13.6	14,020	190,800	19,950	271,500	24,500	333,500
25 to 30	25.4	13,100	333,000	17,900	455,000	22,800	579,000
30 to 35	33.8	12,250	414,000	16,150	545,000	20,700	700,000
35 to 40	30.0	11,410	343,000	14,400	432,000	18,900	567,000
40 to 45	23.4	10,200	238,000	12,150	284,000	16,800	393,000
45 to 50	22.6	9,040	204,000	10,600	239,000	15,400	348,000
50 to 55	20.8	7,870	163,000	8,400	175,000	12,700	264,000
55 to 60	19.8	6,620	131,000	6,720	133,000	10,300	204,000
60 to 65	22.0	5,220	115,000	4,680	103,000	6,930	152,000
65 to 70	19.0	3,130		2,100		4,800	
Totals	246.2		2,377,480		3,000,600		3,987,410
Difference from Room A					623,120		1,609,930

[a]Based on Electric Meter Data.

above floor heat loss in Room A to 101 percent of the calculated above floor heat loss in Room C.

It should be pointed out that the constructions of Rooms A and B were supposedly the same, and therefore the calculated heat losses were the same; however, the measured upward heat flow from Panel B was about 13 percent higher than that of Panel A. Later investigation revealed some torn insulation in the wall of Room B and one small wall area with no insulation. This was repaired after which the measured heat inputs to Rooms A and B were in better agreement. All of the tests reported in the paper were made prior to the time the wall insulation in Room B was repaired. While the condition of the insulation had some effect on results obtained, as pointed out in subsequent sections of this paper, the effect was not of sufficient magnitude to alter conclusions drawn.

While Fig. 6 indicated that there was a large percentage difference in the heat flow downward and from the edge of the different panels at low indoor-outdoor temperature differences, the difference in absolute values was small.

In order to make a true comparison of the effectiveness of the insulation, the data had to be integrated over the whole range of outdoor temperatures experienced. The first two columns of Table 5 show the average outdoor temperature conditions experienced in Urbana, Ill., from 1936 to 1949 for the months of January, February, March, April, May, September, October, November and December. The rest of the table indicates the total reverse losses on a yearly basis based on Figs. 5 and 6. These values were then totaled and the differences taken. The reverse loss of the panel in Room B exceeded that of Room A by 623,120 Btu per year, while the reverse loss in Room C exceeded that of Room A by 1,609,930 Btu per year. Assuming a seasonal operating efficiency of 70 percent, these increases in the reverse losses represent yearly increases in the seasonal fuel consumption of 8.9 and 23.0 therms of gas, or 6.4 and 16.4 gal of fuel oil (140,000 Btu per gal), respectively. This small saving obviously does not warrant the additional expense of providing insulation under the entire slab.

In order to make fair comparisons of subfloor losses for the two types of edge insulation at the same indoor-outdoor temperature differentials, the following conditions should exist:

1. The average water temperature in the panels should be equal.
2. The panel areas should be equal.
3. The above floor room characteristics should be the same.
4. The ground conditions should be the same.

The same design water temperature was used in each room and therefore for any operating condition the water temperatures were approximately the same for each room. Ground conditions were as uniform as it was possible to make them, and since normal variations in the film coefficient on the room side of the panel would produce only a very small change in the downward heat flow, only the difference in the panel area could have an appreciable effect upon its magnitude.

The panel area in Room C exceeded that used in Room B by 29 sq ft. This additional area was located on the side of the room opposite the exposed edge. A test at an average outdoor temperature of 26 F indicated that the increase in downward heat flow amounted to 1.9 Btu per hr for each sq ft of additional panel area. Assuming this to be a representative average value for a heating season consisting of 246 days, the downward heat flow from the panel in Room C corrected to the panel area used in Room B would be $3{,}987{,}410 - (1.9 \times 24 \times 29 \times 246) = 3{,}662{,}100$ Btu per heating season as compared to 3,000,600 Btu per heating season for Room B. Thus, the C-type insulation appears to be about $3{,}000{,}600 \div 3{,}662{,}100$, or 82 percent as effective as the B-type insulation in reducing downward heat flow. While percentage-wise the C-type insulation is only 82 percent as effective as the B-type, the difference in the seasonal reverse loss was $3{,}662{,}100 - 3{,}000{,}600$ or 661,500 Btu. At 70 percent efficiency this is equivalent to 9.2 therms of gas or 6.7 gal of oil. Obviously this difference is of no economic value.

Ground and Edge Losses from a Heated Floor Slab: Fig. 6 shows that at design conditions of 80 F indoor-outdoor temperature difference, the downward heat flow in Rooms B and C amounted to 19.0 and 16.5 percent of the total heat output of the panels, respectively. The heat loss at the edge of both panels was 4 percent of the total.

Thus, 23.0 percent of the total output of the panel in Room B and 20.5 percent in Room C was lost directly to the ground or to the outdoors without being of value to offset the above floor heat losses of the rooms. This is commonly referred to as the reverse loss from the panel.

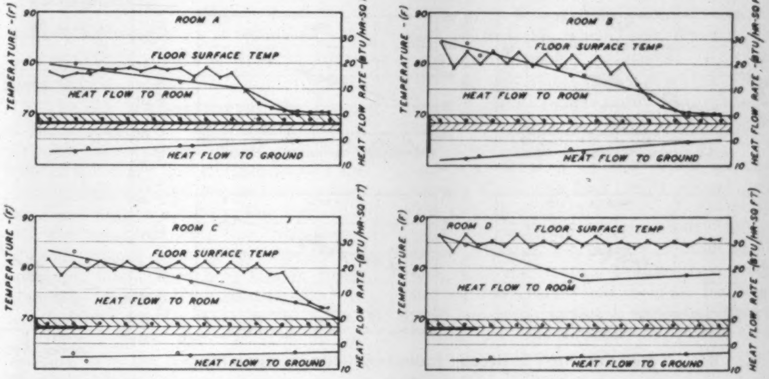


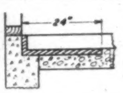
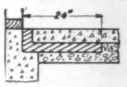
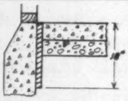
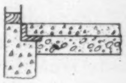
Fig. 7 — Heat flow rates and panel surface temperatures

At the design condition the total heat flow from the panels as determined from Fig. 5 was 5,600 Btu per hr in Room B, and 7,400 Btu per hr in Room C. The reverse losses were 23.0 and 20.5 percent of these values, or 1,290 and 1,515 Btu per hr respectively. After correcting for panel area as described in the preceding section, the reverse losses were 1,340 and 1,515 Btu per hr, respectively, based on the panel area of Room C. These reverse losses are equivalent to 93 Btu per hr per linear ft of exposed edge for Room B, and 104 Btu per hr per linear ft of edge in Room C. Table 6 shows the heat loss, expressed in Btu per hr per linear foot of exposed edge, from both unheated slabs and concrete floor panels of various types of construction. The losses from the unheated floor slabs were obtained from THE HEATING, VENTILATING AIR CONDITIONING GUIDE. A comparison of the 1-in. vertical type insulation shown in Column C indicates that the reverse loss for the concrete floor panel is 43 Btu per hr per linear ft of exposed edge in excess of that for the unheated slab. As applied to Room C, this would amount to 43 × 14.5 or 623 Btu per hr total reverse loss over that for the unheated slab. Thus, using vertical insulation and at a design condition of 80 F indoor-outdoor temperature difference, the fuel required to heat Room C by a concrete floor panel system would be 623/(7400 − 623) × 100 or 9.2 percent greater than that required to heat with a more conventional system. The loss for the unheated slab using the 1-in. edge insulation shown in Column A, Table 6, would be somewhere between 45 and 55 Btu per linear ft because it would be better than the 1-in. edge insulation shown in Column D and not as good as the 2-in. edge insulation shown in Column B. Using a value of 50 and comparing it with 104 for a concrete floor panel with edge insulation shown in Column A, the fuel required to heat Room C at design conditions by a concrete floor panel system would be 783/(7400 − 783) × 100 or 11.8 percent greater than that required to heat with a more conventional system utilizing the same edge insulation.

Table 7—Effect of Radiation and Convection on Heat Flow from Panel

Condition	Btu per hr (sq ft)		
	Meter U-24	Meter V-17	Average
Heat Meters Exposed to Window	25.8	26.3	26.0
Baffle Between Heat Meters and Window 8 in. Clearance Between Floor and Baffle	21.9	21.4	21.6
Baffle Between Heat Meters and Window No Clearance Between Floor and Baffle	15.5	16.8	16.1

Table 6—Heat Losses of Heated and Unheated Floor Slabs
(Btu per linear foot)

Floor Slab				
	A	B	C	D
Unheated[a]	50[b]	45	50	55
Heated	104		93	
Diff	54		43	

[a] THE GUIDE 1953, pp. 232-253.
[b] Estimated

Floor Surface Temperatures: Floor surface temperatures were obtained by means of thermocouples installed on 6-in. centers on a line perpendicular to the north wall and passing through the center of the room. These thermocouples were so arranged that they were located alternately over and midway between coils.

Fig. 7 shows a plot of the heat flows and floor surface temperatures for each of the test rooms at a time when the outdoor temperature was 26.7 F. The figure shows that the maximum variation in floor surface temperature between adjoining active tubes was about 3 deg, while the average surface temperature across the active panel remained practically constant. Even though there was little change in the floor surface temperature across the active panel area, the upward heat flow as measured by the heat meters varied from about 15 Btu per hr per sq ft at the center of the room to about 25 Btu per hr per sq ft near the window. To determine how much of this increase might be assigned to increased radiation and how much to increased convection due to the presence of the window, a piece of insulation board 4 ft high by 8 ft long was placed in a vertical position between

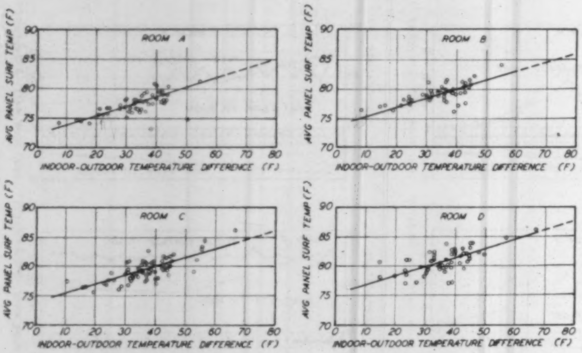


Fig. 8 — Relationship between indoor-outdoor temperature difference and panel surface temperature

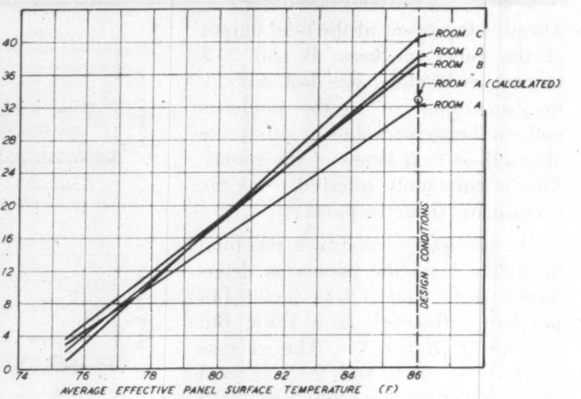


Fig. 9 — Panel outputs to rooms

the windows in Room D and those heat meters nearest to the outer wall. With this baffle located 8 in. above the floor, it offered very little resistance to normal convection currents over the floor, but it did shield the heat meters from the radiation effects of the windows and most of the exposed wall. Dropping the baffle to the floor not only shielded against radiation effects, but also prevented the circulation of cool air from the window and exposed wall over the floor in the area of the heat meter location.

The effect of the baffle location on the heat meter readings is shown in Table 7. When the heat meters were exposed to the window (no baffle) the average upward heat flow rate was 26 Btu per hr per sq ft. With 8 in. clearance between the bottom of the baffle and the floor, the average upward heat flow was reduced to 21.6 Btu per hr per sq ft, and with the baffle located in contact with the floor, the upward heat flow was reduced to 16.1 Btu per hr per sq ft. In other words, increased radiation to windows and cold wall accounted for about 45 percent of the total increase in upward heat flow from the panel near the windows and convection currents accounted for about 55 percent of the total increase.

These readings indicate that a floor panel system has the desirable characteristic of automatically increasing the heat output rates in areas adjacent to points of high heat loss from the room. For a given floor panel surface temperature and room-air temperature, a somewhat higher output per square foot of panel area could be expected in an uninsulated room or in a room with large glass area than in a fully insulated room with limited glass area.

The average effective panel surface temperature for each room was obtained by averaging the readings of all floor surface couples located on the heated portion of the floor. For each room this average temperature was plotted against the indoor-outdoor temperature difference corresponding to the time the readings were taken (Fig. 8). The maximum difference in the average panel surface temperature for all rooms was about 3 deg at any indoor-outdoor temperature difference. Some difference would be expected since the installed panel area was based on the calculated heat loss of the room, and the ratio of the actual heat loss to the calculated ranged from 0.90 for Room A to 1.11 for Room C. It is also true that the panel surface temperatures as measured on the north-south center line of the rooms were not necessarily the same as at other points in the rooms. This was especially true in Rooms A and B where the effect of the smaller window area on the floor temperatures was greater along the center line of the rooms than toward the sides of the rooms. On the other hand, the larger window areas in Rooms C and D affected a greater percentage of the total panel area and hence the temperatures measured along the center line in these rooms probably more closely approximated the true average surface temperature.

It is probable that had the instrumentation in each room been adequate to obtain the true average panel surface temperature for the entire panel area, the difference between rooms would have been even less than that indicated in Fig. 8.

The panel surface temperatures as measured in Rooms B and C were accepted as being representative of the true average for each of the four test rooms, in that the average panel surface temperature as measured on the north-south center line of a room was not exactly representative of the true average, and the curves for Rooms B and C were the mean of all four rooms with only a 1.5 deg deviation from the extremes.

The curves of Fig. 9 were constructed by dividing the upward heat flow from each panel (Figs. 5 and 6) at any given indoor-outdoor temperature difference by the panel area and plotting the quotient against the corresponding panel surface temperature as obtained from the mean of the curves in Fig. 8.

These curves show the relationship between panel output to the test room and panel surface temperature. At a design condition of 80 deg indoor-outdoor temperature difference, the average panel surface temperature for all rooms was taken as 86 F, while the panel output varied from 32.4 Btu per hr per sq ft for Room A to 40.6 Btu per hr per sq ft for Room C.

The output of the panel in Room B was higher than that of Room A, while the calculated heat losses of the two rooms were the same. Due to faulty insulation, the actual heat loss of Room B was higher than that of Room A. Since the two rooms had the same panel area, it follows that the heat emission rate from Panel B must have been higher than that from Panel A, either as a result of higher operating temperature or of an increase in radiation because of the lower wall surface temperature over the poorly insulated area. Had the insulation in Room B been identical to that in Room A, the curve for Room B in Fig. 9 would have approached that for Room A.

It can be seen that at design conditions, the output of the panels in Rooms C and D, with two windows each, was 20 to 25 percent greater than the output of the panel in Room A, with only one window. This is in agreement with the results of the special test showing the effect of windows on panel output.

The circle plotted at design conditions in Fig. 9 was obtained by calculation using the formulae 3 and 5 given on pages 555 and 556 in THE GUIDE 1953 substituting an average unheated surface temperature of 66.5 F, a room-air temperature of 72 F, and a panel surface temperature of 86 F. All these values correspond to observed conditions in Room A at an indoor-outdoor temperature difference of 80 F. It can be seen that the output of the panel in Room A was essentially the same as the calculated value while the panel outputs in Rooms C and D were higher than the calculated value by almost 20 percent, or about 6.5 Btu per hr per sq ft. Had the actual average unheated surface temperatures for Rooms C and D been known and used in calculating the panel output, the calculated output would have more nearly approached the test values for these rooms.

Conclusions

The following is a summary of the results obtained for the test conditions investigated.

1. The air temperatures at the center of the rooms were very uniform, with a variation between the floor and 60-in. level of 0.5 deg. The temperatures of the air 3 in. below the ceiling and 3 in. above the floor were practically the same.
2. The measured heat flow from panel to room ranged from 87 percent of the calculated above floor heat loss in Room A to 101 percent of the calculated above floor loss in Room C.
3. It was found that the fuel savings resulting from the use of insulation under the entire floor slab as compared to the use of edge insulation only was too small to warrant the additional cost.
4. Vertical insulation along the inside edge of the foundation wall was as effective as the L type edge insulation. The savings in material and the ease of installation made the vertical insulation the more desirable of the two types.
5. At design conditions, the reverse loss from panels with edge insulation amounted to 20 to 23 percent of the total panel output. The reverse loss was roughly twice as great as the estimated heat loss through unheated floor slabs using the heat transmission values given in THE GUIDE 1953.
6. Comparisons of the reverse loss from the heated slabs, with figures presented in Chapter 12 of THE GUIDE 1953 for heat losses from unheated floor slabs, indicate that at an indoor-outdoor temperature difference of 80 F, the fuel consumption when using floor panels, would exceed the fuel consumption when using radiators or convectors by about 10 percent.
7. It was found that while the mean floor surface temperature was uniform across the panel, the heat emission rate was much higher near the exposed wall and window than at the center of the room. Thus, the floor panel system had the desirable characteristic of automatically increasing the heat output rate in areas adjacent to points of high heat loss from the room. For a given floor surface temperature and room-air temperature, one could expect a somewhat higher output per square foot of panel area in an uninsulated room or one with large glass area than in a fully insulated room with limited glass area.
8. At design conditions, the measured heat transfer from the panel to Room A was 1.5 percent less than the calculated output obtained by substituting actual measured air, panel surface and average unheated surface temperatures in Equations Nos. 3 and 5 in Chapter 24 of THE GUIDE 1953.

Acknowledgment

The authors wish to acknowledge the assistance of the Small Homes Council, a division of the University, which made available the laboratory and many of the instruments used in the tests. The authors also thank those companies which have supplied equipment and instruments.

Excellent Program Features 49th Annual *ASRE* Meeting

A near record attendance marked the 49th Annual Meeting of the *American Society of Refrigerating Engineers* held in Washington, D.C., December 6-9, 1953. Four technical sessions, two conferences and two symposiums highlighted the meeting attended by almost 1000 members, wives and guests. Many committee meetings were held and plans were developed for the 50th anniversary year of the Society in 1954.

On the last day of the meeting, at a general assembly in the Main Ballroom, charters were presented to the Louisville and Dayton Sections. Following the presentation of several awards the following officers were inducted for the coming year: *President*—A. J. Hess, Los Angeles, Calif.; *First Vice President*—Leon Buehler, Jr., Chicago, Ill.; *Second Vice President*—C. M. Ashley, Syracuse, N. Y.; *Treasurer*—Hermann Spoehrer, St. Louis, Mo.

Monday Morning

At the first technical session Pres. R. C. Jordan presided. The first paper, Heat Transfer Potential between Moist Air and Water, by F. Rasori, was presented by Edward Simons, and was discussed by E. P. Palmatier, H. E. Degler, F. E. Ince and C. M. Ashley.

Dr. F. K. Hick presented the second paper, Environmental Research and its Relation to Health and Comfort, and discussed the early work of Dr. E. F. DuBois, the development of the ASHVE Comfort Chart and the physiological studies conducted at the University of Illinois School of Medicine since 1936 under Dr. R. W. Keeton.

The Measurement and Control of Humidity in Air and Gases, by J. C. Hawkins, was the third paper of the session. Mr. Hawkins described instruments used to determine wet and dry bulb temperatures and for automatically recording dewpoint by means of instruments using brightly reflecting mirrors, photoelectric cells and thermocouples.

Thermometer Systems, by L. E. Smith, the fourth paper, contained a discussion of different types of temperature recording devices and how they function. Four classifications of thermometers were mentioned by the author: (1) liquid filled; (2) vapor filled; (3) gas filled; and (4) mercury filled. He pointed out the various applications for these different types.

The Domestic Refrigerator Engineering Conference was also held on Monday morning and a Panel Discussion on Recent Developments in Plastics for Refrigerators and Home Freezers comprised the session. R. W. Ayres presided and the panel members included: J. C. Kazimier, C. Massopust, D. Eldred, J. N. Ruthenburg, R. W. Barber, H. A. Hoppens, W. C. Schlager, and E. Szantay.

The Second Technical Session was held in the Main Ballroom on Monday afternoon with Vice Pres. A. J. Hess presiding. Papers were presented by the following: L. W. Larsen — Drying Methods and Techniques; E. W. Flosdorf — Freeze Drying 1953; W. E. Fontaine, W. L. Sibbitt, and F. N. Andrews — The Effect of Climatic Environment on the Growth Rate and Feeding Efficiency of Swine; and Merl Baker and E. B. Penrod — Influence of Storage Conditions on Drying and Discoloration of Beef.

J. R. Hornaday presided at the Heat Pump Symposium held on Monday afternoon. The moderator was C. H. Coogan. A 1953 Appraisal of Heat Pumps by H. E. Voegeli described the principle of heat pumps as originally developed about 75 years ago and its subsequent development.

J. L. Threlkeld presented a paper entitled Thermodynamic Study of Vapor Compression Heat Pump Cycles. He described a single-stage compressor cycle and its efficiency when using "Freon-11" at various operating temperatures with both a single temperature heat sink of 120 F, and variable temperature heat sink from 60 to 120 F. In the latter case a multiple-stage compressor is considered advisable according to Professor Threlkeld.

E. B. Penrod discussed Sizing Earth Heat Pumps for Three Different Latitudes and developed the mathematics for determining earth temperatures at Lansing, Mich., Lexington, Ky., and Atlanta, Ga. Professor Penrod stated that the length of pipe can be determined from the maximum heating load condition. He contended that the earth heat pump is feasible as far north as Vancouver with some supplementary heating.

Heat Pump Performance in Western Pennsylvania, by C. L. Goodman, was the last paper of the Symposium and covered six heat pump installations near New Castle, Pa. According to Mr. Goodman, this particular region has extended periods of overcast weather in the winter and little solar regain is possible.

The Air Conditioner Conference, Justin Neuhoff, chairman, got underway on Tuesday morning with G. S. Jones, Jr., managing director of *ARI*, as the keynote speaker. J. D. Lovely presented a paper on The Performance and Operational Costs of Air Cooled Packaged Cooling Units. He pointed out some of the problems in residential units including water shortages and the increased operating costs.

The second speaker, W. O. Kline, talked on Closer Control of Room Humidity Unit Conditioners. In his talk, he pointed out that the shutting down of air conditioning units at night results in only a small rise in dry bulb compared to the large increase in wet bulb temperature caused by the difference in vapor pressure between indoors and outdoors.

Henry Wolf and Henry Soumerai in their paper, Protection of Integral Horsepower, Refrigerant Cooled Hermetic Motors as Applied to Packaged Self-Contained Air Conditioning Units, emphasized the importance of maintaining low temperatures in the motor windings to prolong motor life.

The fourth speaker, W. M. Simpson in his talk, There is No Magic in Refrigeration from Heat, described absorption refrigeration systems. Since power for electric units is supplied in a relatively pure state after many losses in generation and transmission, it is unfair to compare efficiencies of absorption systems using gas directly with electrical powered units.

Marketing Programs which Can Make the Packaged Air Conditioner Business More Year-Round was the subject of a paper by J. R. Hertzler. He summarized sales data for the years 1948-52 and noted that in three out of those five years maximum shipments of packaged units 2 hp and larger were in the month of June.

How to Sell Packaged Air Conditioning at a Profit, by D. V. Petrone, outlined the important considerations in selling, and Mr. Petrone stated that adequate basic engineering knowledge of the sales engineer cannot be over-emphasized.

The last paper of the conference, Self-Contained Air Conditioner — Product Quality Improvement, by R. G. Cordes, was a discussion of a planned quality control program. In carrying on such a program complete records are kept of all failures (leaks) in compressors when tested after manufacture, and the results are tabulated. A careful analysis of results will bring about improved quality.

At the Third Technical Session on Tuesday morning, Vice Pres. Leon Buehler, Jr., presided and five papers were presented and discussed: H. M. Parmelee — The Solubility of Freon Refrigerants in Water, Compounds Boiling Below 32 F; Cecil Boling, W. J. Donovan, and A. S. Decker — Heat Transfer of Evaporating Freon with Inner-Fin Tubing; H. C. Brown and L. G. Bish — The Effect of Convection and Moisture Deposition on Heat Transmission through Cold Storage Walls; O. D. Colvin and H. H. R. Niemann — Improved Cold Storage Insulation through Use of Dehumidification; and J. J. Maguire — Corrosion in Cooling Water Systems.

Edward Simons was moderator at the Water Conservation Symposium on Wednesday morning.

R. C. Kelly, Executive Manager of the Cooling Tower Institute, described Large Built-Up Cooling Towers. He pointed out the water problems and the construction difficulties in building large towers. An analysis of the development of cooling towers was presented by him and he described the large variety of cooling towers which are in use today.

The second speaker, E. B. Dunphy, presented some comments on Factory Assembled, Smaller Cooling Towers. He pointed out that smaller cooling towers are a fairly recent development in the industry, a development which has been spurred by water restrictions.

Evaporative Condensers was the subject of H. E. Rex and he claimed several advantages for the evaporative condenser over the cooling tower in the smaller sizes.

The final speaker of the symposium was O. J. Nussbaum who spoke on Air Cooled Condensers. He claimed several advantages for this type of unit over the water cooled systems emphasizing its simplicity and the possibility of locating the condenser as an integrated remote unit.

The Fourth Technical Session was held on Wednesday morning with Treasurer C. M. Ashley presiding. Three papers were presented on the following subjects; What Standards Have Done to Promote the American Economy, by G. F. Hussey; Standards in the Refrigeration Industry, by J. R. Chamberlain; and Air Conditioning in the Textile Field, by W. L. Fleisher and J. H. Burges.

Research Exhibit

A technical Research Exhibit in the Shoreham Lobby was held in connection with the meeting. The ASHVE presented a demonstration of two Research Laboratory projects.

JOURNAL SECTION

Utilization of Solar Energy for House Heating†

By J. L. Threlkeld* and R. C. Jordan**, Minneapolis, Minn.

This paper is the result of research sponsored by The American Society of Heating and Ventilating Engineers in cooperation with the Department of Mechanical Engineering of the University of Minnesota

SUMMARY—This second of three papers deals with methods of utilizing solar energy for house heating and the major components of solar energy-heat pump systems. Possible paths for energy flow are discussed. A rational method is developed for calculating daily collector efficiency and curves for efficiency are presented for clear and partly cloudy days. Values of threshold radiation are presented and the optimum number of glass panes for a flat-plate type collector are determined. Storage of solar energy is considered and specific heat and heat of fusion methods are compared. The application of heat pumps to year around air conditioning is discussed and a method is developed for estimating the coefficient of performance for actual heat pumps. Curves are presented giving the practical coefficient of performance of single-stage and step condensation systems.

The utilization of solar energy for the partial heating of homes is not new. For a number of years, the so-called *solar house*, involving large south-facing windows placed to admit a maximum of winter sunshine and with protection from the summer sun by roof overhang, has received fairly common application in modern architecture. Such a design may or may not effect a decrease in the actual fuel bill. When the sun is shining, fuel will be saved and the house may even overheat. However, at night and during cloudy days a large heat loss will occur through the glass areas and contradictory reports on the effect upon the fuel bill are found in the literature.[1]

Major disadvantages of the solar house are the excessive heat losses through the glass areas, inability to store surplus solar energy available during sunny days for use at night and during cloudy days, and lack of control of the entry of sunshine. These disadvantages may be obviated by use of a roof or wall type collector together with heat storage.

Hottel and Woertz[2] and Hesselschwerdt[3] have given results on two experimental houses built at the Massachusetts Institute of Technology. Each house employed a roof type collector and water heat storage. The house investigated by Hottel and Woertz included a 17,000 gal water storage tank. Lof[4] has conducted tests at the University of Colorado on a house using a roof type collector and employing crushed rock as the heat storage medium.

Maria Telkes has pioneered in the use of chemical compounds for storage of solar energy, making use of the heat of fusion rather than the specific heat effect. In a series of articles,[5, 6, 7, 8] she has discussed problems of solar heating, use of chemical compounds for heat storage, and a report of investigations on an experimental solar house at Dover, Mass. The Dover House was of two-story, shed-roof construction with a 720 sq ft collector occupying the south-facing vertical wall of the second floor. Heat storage was provided by 21 tons of Glauber's salt ($Na_2SO_4 \cdot 10H_2O$) and was capable of supplying the heating requirements of about 10 sunless December days.

Solar energy may be utilized in several ways, depending upon the type of collector, the temperature of collection, and the system of heat storage, if any. Fig. 1 shows possible paths of energy flow for systems which utilize solar energy as either a partial or complete heat source. Both winter and summer paths of energy flow are shown.

For winter operation, solar energy may be collected by one of several means, and if collection temperature is higher than normal room temperature (about 70 F) this energy may flow directly to the demand or may be stored for subsequent use. If solar energy is collected at a temperature lower than 70 F, it must pass to a heat pump where its temperature level is raised, and the heat pump may then reject heat either to the demand or to storage. Storage of heat energy may occur on either the evaporator or condenser side of the heat pump or both. Solar energy may be used either as a partial or a complete heat source. In general cases, heat from supplementary sources is necessary and in any system supplementary heat from a fuel-fired or electrical source may be used. In systems incorporating a heat

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†This is the second of three papers concerned with potential utilization of solar energy as a heat source for the heat pump, and will be used in partial fulfillment of the requirements of the doctor of philosophy degree of J. L. Threlkeld.

*Associate Professor, Department of Mechanical Engineering, University of Minnesota. Member of ASHVE.

**Professor and Head, Department of Mechanical Engineering, University of Minnesota. Member of ASHVE.

[1] Exponent numerals refer to References.

For presentation at the 60th Annual Meeting of The American Society of Heating and Ventilating Engineers, Houston, Tex., January 1954.

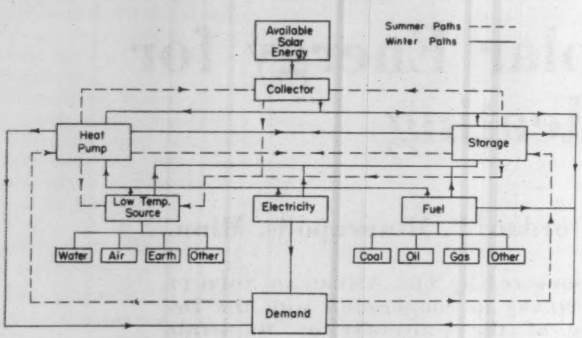

Fig. 1 — Possible paths of energy flow for year around air conditioning systems which utilize solar energy as a winter heat source

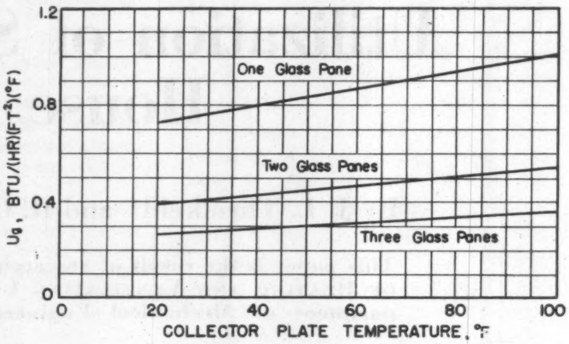

Fig. 2 — Overall coefficient of heat transfer U_g from collector plate through glass panes to outdoor environment

pump, low temperature heat sources such as ground water, outdoor air, and the earth may serve as supplementary sources.

Summer paths of energy flow are shown in Fig. 1 as summer cooling may frequently be an integrated part of the system in those systems using a heat pump. Energy may flow from the demand either to the heat pump or to a low-temperature form of heat storage. The heat pump may reject heat to a low-temperature source such as water or outdoor air, to a high-temperature form of storage, or possibly to the solar collector which could act as a heat sink or dissipator in summer. The low-temperature storage may reject heat to the heat pump or possibly to a low-temperature source such as well water. The high-temperature storage may reject heat to a low-temperature source or to the collector.

As illustrated by Fig. 1, the main components of a solar energy-heat pump system are the collector, the heat storage facility, and the heat pump. In addition, transport systems are required for transferring energy from the collector to the demand via the heat pump and the heat storage facility but design information on air and liquid circulation systems is well established. In the following sections, collectors, heat storage systems, and heat pumps are discussed.

Solar Energy Collectors

Type, Construction, and Orientation of Collector. The collection of solar energy has been attempted for many purposes and several types of collectors have been developed. One constructed in Germany produced temperatures higher than 6000 F[9]. Abbot[10] has extensively studied the problem of high-temperature collectors. The inherent disadvantage of high-temperature collectors is their low collection efficiency.

In order to collect solar energy for house heating purposes in an efficient manner, it is desirable to keep the temperature of the collector plate at a relatively low level. For such application the flat-plate type of collector with one or more separated sheets of glass in front of the collector plate is the most common. Maria Telkes and E. Raymond[11] at the Dover House used such a collector made of standard sheets of thin galvanized iron painted black and nailed directly to the back of 4 x 4-in. wood uprights. Two glass panes, 1 in. apart, were mounted in front of the collector plate. A duct, 3-5/8 in. deep, was provided between the back of the collector plate and an insulated panel closing off the duct. Heat was absorbed from the collector by circulating air. Similar types of collectors with water pipes soldered to the back of the collector plate have also been used.

The best orientation for a collector is a south-facing vertical position. As discussed in an earlier article[12] a slightly greater amount of direct solar radiation impinges on a south-facing collector tilted to its optimum angle. However, there are several disadvantages associated with a tilted collector. Compared with a south-facing vertical collector a tilted collector is more likely to be covered by dust and snow, will receive less reflected radiation from the ground cover in front of the collector, will intercept far more radiation in summer, and is more difficult to incorporate into the house structure architecturally.

Efficiency of South-facing, Vertical, Flat-plate Collectors. The steady state performance of a solar collector which has both sides exposed to the outdoor environment is given by the relation

$$q_c = \tau_D a_D\, q_D + \tau_d a_d\, q_d - (U_g + U_b)(t_c - t_o) \quad \text{.................(1)}$$

Substituting

$$(\tau a)_t = \tau_D a_D\, q_D/(q_D + q_d) + \tau_d a_d\, q_d/(q_D + q_d) \quad \text{..............(2)}$$

in Equation 1 gives

$$q_c = (\tau a)_t\,(q_D + q_d) - (U_g + U_b)(t_c - t_o) \quad \text{................(3)}$$

If the collector is an integral part of the building so that no loss of useful heat occurs through the backside, then

$$q_c = (\tau a)_t\,(q_D + q_d) - U_g\,(t_c - t_o) \quad \text{.............(4)}$$

Hottel[13] has presented graphs giving values of $(\tau\alpha)_t$ as a function of the cosine of the angle of incidence for collectors having two panes and three panes of clear plate glass. Values of $(\tau\alpha)_t$ for a collector with one glass pane may be calculated by Equation 2 using the data of Hottel and Woertz[14]. Values of $(\tau\alpha)_t$ for January 15 at 42 deg north latitude are shown in Table 1 for collectors with one, two, and three glass panes.

The overall heat transfer coefficient U_g may be calculated from results given by Hottel and Woertz[15]. To a close degree of accuracy,

$$U_g = \frac{1}{\dfrac{n}{\sqrt[4]{\dfrac{T_c - T_o}{n+f}}} + \dfrac{1}{h_w}} + \frac{\sigma(T_c^4 - T_o^4)}{(T_c - T_o)\left(\dfrac{1}{\epsilon_c} + \dfrac{2n+f-1}{\epsilon_g} - n\right)} \text{---------} (5)$$

For a wind velocity of 10 mph, Hottel and Woertz give values of $h_w = 4.0$ Btu per (hr) (sq ft) (F), $f = 0.36$, and for a vertically placed collector $c = 0.135$. Both ε_c and ε_g may be taken equal to 0.95. Equation 5 was used to calculate values of U_g for $n = 1$, 2, and 3 panes, for t_c ranging from 20 F to 100 F, and for t_o ranging from 0 F to 60 F. The results are shown in Fig. 2 which indicate that U_g is very closely a function of the collector plate temperature t_c only.

The remaining data necessary for solution of either Equation 3 or 4 are hourly rates of total solar and sky radiation incident upon a south-facing vertical surface. Two cases have been adopted: (1) for a typical cloudless day on January 15 at 42 deg north latitude when the daily total incident radiation is 1780 Btu per sq ft as previously calculated by the authors[16] and (2) for a partly cloudy day on January 15 at 42 deg north latitude when the daily total incident radiation is 1000 Btu per sq ft. The assumed rates of radiation are shown in Table 2.

The daily collector efficiency in percent is given by the relation

$$\eta = (100)\ Q_c/Q_t \text{ .... } (6)$$

where

$$Q_c = \int_{\theta_1}^{\theta_2} q_c \, d\theta \text{ ---------------------- } (7)$$

$$Q_t = \int_{\theta_1}^{\theta_2} (q_D + q_d)\, d\theta \text{ ---------------- } (8)$$

Table 1—Effective Transmissivity — Absorptivity Product $(\tau\alpha)_t$ for a Black Collector Plate and System of Glass Panes for January 15 at 42 Deg North Latitude

Sun Time	Cosine of Incidence Angle	$(\tau a)_t$ One Glass Pane	Two Glass Panes	Three Glass Panes
8:00 a.m.	0.58	0.814	0.705	0.655
9:00	0.71	0.830	0.750	0.695
10:00	0.81	0.855	0.770	0.720
11:00	0.87	0.855	0.780	0.725
12:00	0.89	0.855	0.785	0.730
1:00 p.m.	0.87	0.855	0.780	0.725
2:00	0.81	0.855	0.770	0.720
3:00	0.71	0.830	0.750	0.695
4:00	0.58	0.814	0.705	0.655

Collector Nomenclature

c = a constant, Btu per (hour) (square foot) (Fahrenheit degree).$^{5/4}$
f = ratio of thermal resistance of outer glass pane to that of an average inner pane, dimensionless.
h_w = convection coefficient due to wind, Btu per (hour) (square foot) (Fahrenheit degree.)
n = number of glass panes, dimensionless.
q_c = rate of heat collection by transport medium, Btu per (hour) (square foot).
q_D = rate of incident direct solar radiation, Btu per (hour) (square foot).
q_d = rate of incident diffuse radiation, Btu per (hour) (square foot).
Q_c = total daily energy collected by transport medium, Btu per (day) (square foot).
Q_t = total daily incident radiation, Btu per (day) (square foot).
Q_{th} = total daily threshold radiation, Btu per (day) (square foot).
t_c = average temperature of collector plate, Fahrenheit.
t_o = outdoor air temperature, Fahrenheit.
T_c = average temperature of collector plate, Fahrenheit absolute.
T_o = outdoor air temperature, Fahrenheit absolute.
U_b = overall heat transfer coefficient from collector plate through backside to outdoor environment, Btu per (hour) (square foot) (Fahrenheit degree).
U_g = overall heat transfer coefficient from collector plate through glass panes to outdoor environment, Btu per (hour) (square foot) (Fahrenheit degree).
a_D = absorptivity of collector plate for direct solar radiation, dimensionless.
a_d = absorptivity of collector plate for diffuse radiation, dimensionless.
ϵ_c = emissivity of collector plate for low temperature radiation, dimensionless.
ϵ_g = emissivity of glass panes for low temperature radiation, dimensionless.
η = daily collector efficiency, percent.
θ = time, hour
σ = Stefan-Boltzmann constant, (0.173) (10^{-8}), Btu per (hour) (square foot) (Fahrenheit absolute).^{4}
τ_D = transmissivity of system of glass panes for direct solar radiation, dimensionless.
τ_d = transmissivity of system of glass panes for diffuse radiation, dimensionless.
$(\tau a)_t$ = effective transmissivity — absorptivity product of system of glass panes and collector plate, dimensionless.
$(\tau a)_{t,m}$ = daily mean value of $(\tau a)_t$ dimensionless.

Certain approximations are contained in the mathematical developments on collector performance presented here. No shading of the collector face and no dust cover is assumed. The equations are for the steady state and thus no heat storage effects are recognized. Absorption of solar energy by the glass panes is neglected. It is assumed that the outdoor environment to which the collector radiates is at the outdoor air temperature. All of these approximations, however, should involve but a small error. Hottel and Woertz[17] have shown that for a south-facing collector tilted 30 deg from the vertical the reduction of energy collection due to dust was on the average about one percent. The same authors also found that storage effects were small for the type of collector analyzed here. In regard to daily collector efficiencies, storage effects should partially cancel out. For a good quality of glass, absorption of solar energy is small and the neglecting of it provides conservative results. It may be concluded that collector efficiencies calculated by Equation 6 are representative of maximum efficiencies to be expected from vertical, flat-plate collectors.

Calculations were carried out finding daily collector efficiencies for collectors with one, two, and three glass panes, for various collector plate temperatures, for various outdoor air temperatures, for the case of no net loss of useful heat from the back of the collector, and for the case of loss from the backside of the

Table 2—Typical Rates of Solar and Sky Radiation ($q_D + q_d$) in Btu per (hr) (sq ft) for a Clear Day and a Partly Cloudy Day on January 15 at 42 Degrees North Latitude

Sun Time	$q_D + q_d$ Clear Day	$q_D + q_d$ Partly Cloudy Day
8:00 a.m.	82	82
9:00	179	90
10:00	231	115
11:00	261	130
12:00	272	136
1:00 p.m.	261	130
2:00	231	115
3:00	179	90
4:00	82	82

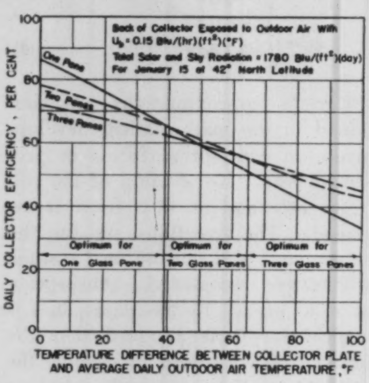

Fig. 3 — Daily efficiency η for a solar collector with rear exposed to outdoor environment for January 15 at 42 deg north latitude on a clear day

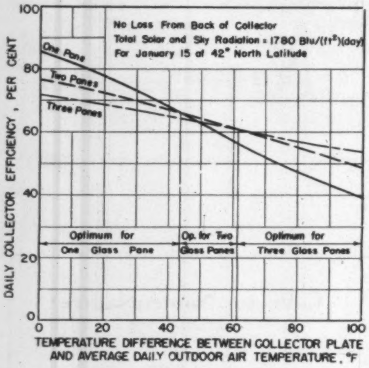

Fig. 4 — Daily efficiency η for a solar collector with no loss from rear for January 15 at 42 deg north latitude on a clear day

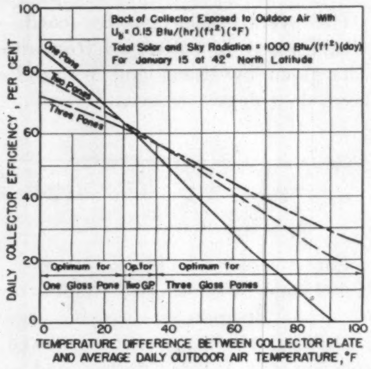

Fig. 5 — Daily efficiency η for a solar collector with rear exposed to outdoor environment for January 15 at 42 deg north latitude on a partly cloudy day

collector with U_b = 0.15 Btu per (hr) (sq ft) (F). Hourly values of q_c were found from either Equation 3 or 4 and daily efficiencies by Equation 6. The integrations of Equations 7 and 8 were performed by Simpson's rule. The variation in outdoor air temperature was accounted for in the following manner. The calculations were made for days when the 24 hr average outdoor temperature was 0 F, 20 F, and 40 F. Typical diurnal curves for variation in outdoor temperature were constructed and these curves were used for finding t_o in the calculations. The calculations indicated that the daily collector efficiency η was very closely a sole function of the difference in temperature between the collector plate and the daily average outdoor air temperature.

Fig. 3 presents results for daily collector efficiency for the case of $U_b = 0.15$ Btu per (hr) (sq ft) (F) and daily total incident radiation Q_t = 1780 Btu per sq ft. Fig. 4 presents results for the case of no loss from backside of collector and Q_t = 1780 Btu per sq ft. Fig. 5 presents results for the case of U_b = 0.15 Btu per (hr) (sq ft) (F) and Q_t = 1000 Btu per sq ft. Fig. 6 presents results for the case of no loss from backside of collector and Q_t = 1000 Btu per sq ft. Each graph shows that there is an optimum range of temperature difference for each system of glass panes which yields the maximum daily efficiency. Comparison of Figs. 5 and 6 with Figs. 3 and 4 shows that when the daily incident radiation is reduced to 1000 Btu per sq ft the daily collector efficiency decreases and the optimum ranges of temperature difference for the different arrangements of glass panes are shifted to the left to smaller temperature differences. Significant are the narrow optimum range for two glass panes, the broad optimum range for three glass panes, and the rapid decrease of collector efficiency with large temperature difference. It is evident that for high collector efficiency a small temperature difference is necessary. It is only in systems using a heat pump that this is possible.

The collector efficiencies presented here have been calculated for January 15 at 42 deg north latitude but the results are applicable to all parts of the United States during December and January because the variation in the transmissivity-absorptivity product $(\tau\alpha)_t$ for a south-facing vertical collector is slight during this period. Figs. 3 and 4 constructed for a daily total radiation of 1780 Btu per sq ft should be applicable for clear days throughout the country.

Threshold Radiation for South-facing, Vertical, Flat-plate Collectors. Valuable information concerning solar collectors includes a knowledge of minimum totals of daily radiation below which no useful collection results. Thus, if Equation 3 is equated to zero

$$q_D + q_d = (U_g + U_b)\ (t_c - t_o)/(\tau\alpha)_t \quad \ldots\ldots\ldots\ldots\ldots\ldots (9)$$

For those days when no energy is collected considerable cloudiness must occur. Usually there is little variation in outdoor air temperature during daylight hours of a very dark day. Thus, it is reasonable to assume t_o as constant. For a fixed collector plate temperature t_c, the only variable in Equation 9 is $(\tau\alpha)_t$. If a mean value of $(\tau\alpha)_t$ is found, then the daily threshold radiation Q_{th} for the 8 a.m. to 4 p.m. period is given by

$$Q_{th} = 8(U_g + U_b)\ (t_c - t_o)/(\tau\alpha)_{t,m} \quad \ldots\ldots\ldots\ldots\ldots\ldots (10)$$

Values of $(\tau\alpha)_{t,m}$ were found by the relation

$$(\tau\alpha)_{t,m} = \frac{1}{8}\int_{\theta_1}^{\theta_2} (\tau\alpha)_t\, d\theta \text{ ---- ------} (11)$$

with the integration performed by Simpson's rule. Values of $(\tau\alpha)_{t,m}$ calculated by Equation 11 from the data of Table 1 are 0.845 for one glass pane, 0.762 for two glass panes, and 0.710 for three glass panes.

Fig. 7 shows threshold radiation Q_{th} in Btu per (sq ft) (day) for various collector plate temperatures and various outdoor air temperatures for collectors with one and two glass panes and with the backside of the collector exposed with $U_b = 0.15$ Btu per (hr) (sq ft) (F). As would be expected, the threshold radiation increases rapidly with increase of collector plate temperature or decrease in outdoor air temperature. A disadvantage of a collector with one glass pane is its relatively high threshold radiation and consequent inability to efficiently collect solar energy during partly cloudy days.

Optimum Number of Glass Panes for a South-facing, Vertical, Flat-plate Collector. The optimum temperature of collection depends upon whether a heat pump is incorporated into the system. In any case, the collector efficiency is highest, and consequently the required collector area is lowest when the collector plate is kept at the lowest possible temperature. If no heat pump is used a collector plate temperature in the order of 100-110 F appears to be minimal for satisfactory results. If a heat pump is included a much lower collector plate temperature may be employed and still provide a relatively high-temperature source of heat when compared to other common heat pump sources. The determination of an optimum collector plate temperature for a system with a heat pump involves consideration of operating costs and the amortized cost of the entire solar energy-heat pump system. Also important is the location and type of heat storage used. If a heat of fusion type of storage medium is used on the evaporator side of the heat pump, the storage temperature should be satisfactory for storage of summer cooling effect also. This requires a storage temperature in the order of 40-60 F. For a generalized typical case where a heat pump is used, a collector plate temperature of about 60 F appears representative.

Assuming a collector plate temperature of 60 F, conclusions may be made concerning the optimum number of glass panes to use in the collector. To do this it is necessary to analyze Figs. 3-7. It is also necessary to know the average outdoor air temperature in January for the locality concerned. Table 3 shows the number of glass panes which give the maximum collector efficiency for $U_b = 0.15$ for Madison, Wis., Lincoln, Nebr., Nashville, Tenn., and New Orleans, La. Also shown is the threshold radiation for each locality. Considering collector efficiency, threshold radiation, and cost of glass, the optimum number of glass panes appears to be two for Madison and Lincoln and one for Nashville and New Orleans. Generally, it may be concluded that two panes are optimum in the northern part of the country and one pane in the southern part when the collector plate temperature is about 60 F.

Table 3 — Number of Glass Panes for Maximum Collector Efficiency and Threshold Radiation for Various Numbers of Glass Panes for a Collector Whose Plate Temperature is 60 F and Backside Exposed with $U_b = 0.15$ Btu per (hr) (sq ft) (F)

City	January Average Outdoor Air Temp. F	$t_c - t_o$ F	Number of panes for Max. Eff.		Threshold Radiation Btu per (sq ft) (day)		
			$Q_t = 1780$	$Q_t = 1000$	One Pane	Two Panes	Three Panes
Madison	18	42	2	3	405	274	220
Lincoln	25	35	1	2	338	228	184
Nashville	40	20	1	1	193	130	105
New Orleans	55	5	1	1	48	33	26

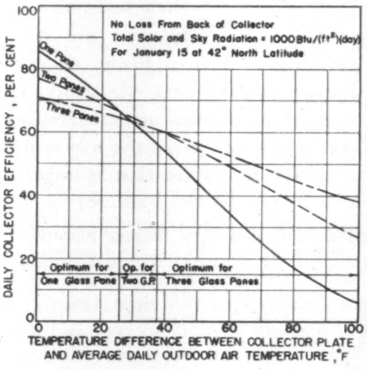

Fig. 6 — Daily efficiency η for a solar collector with no loss from rear for January 15 at 42 deg north latitude on a partly cloudy day

Storage of Solar Energy

Requirements for an Ideal Storage Medium. It is evident that if solar energy is to contribute any appreciable part of the heating requirements for a building, energy must be stored during sunny periods for use at night and during cloudy days. Thus it is necessary to have a quantity of heat storage material suitably placed in the system to accomplish this function.

An ideal heat storage system includes at least the following features:

1. Low cost and ready availability of storage medium.
2. Non-hazardous, non-offensive materials.
3. A storage medium which is non-corrosive to common construction materials.
4. A simple, inexpensive means of packaging the storage medium.
5. High heat capacity per unit volume of storage medium.
6. High heat capacity without large temperature change of storage medium.
7. Heat storage at a moderately low temperature.
8. Low thermal losses from storage medium to ambient surroundings.

Items 1 through 5 and Item 8 are self-explanatory. In Items 6 and 7, high heat capacity without large temperature change and heat storage at a moderately low temperature are required for high collector efficiency and/or high heat pump coefficient of performance.

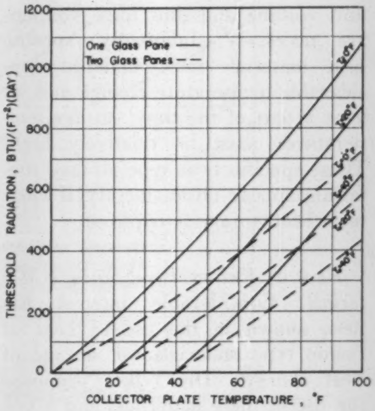

Fig. 7 — Threshold radiation for a collector with rear exposed to outdoor environment for January 15 at 42 deg north latitude

Table 4 — Properties of Various Specific Heat Type Storage Materials

Material	Specific Heat Btu per (lb) (F)	Density lb per cu ft	Heat Capacity Btu per (cu ft) (F)
Water	1.00	62.4	62.4
Iron	0.11	490	53.9
Concrete	0.27	140	37.8
Brick	0.20	140	28.0

Specific Heat Type of Storage Materials. In all systems employing a specific heat type of storage material temperature change of the material is necessary and consequently widely varying temperatures of the medium result. For a given volume and temperature change the heat capacity is proportional to the product of the specific heat and density. Table 4 shows specific heat, density, and heat capacity in Btu per (cu ft) (F) for four low cost materials. It is seen that water is superior to the other materials from a standpoint of heat capacity.

When specific heat materials are analyzed with respect to satisfaction of the features of the ideal medium then common materials such as those of Table 4 are excellent from a standpoint of low cost, ready availability, safety and non-corrosion. Most of these materials need an inexpensive type of container with the exception of water. The main disadvantages of specific heat materials are that they rate poorly with respect to Items 5 through 8 of the features of the ideal medium. Specific heat materials have low heat capacities per unit volume and thus huge volumes are necessary. Inherently, specific heat materials must undergo considerable temperature change and, at least a part of the time, storage temperatures must be relatively high. Thus, specific heat type storage materials appear unsatisfactory if long-term heat storage is required.

Heat of Fusion Type Storage Materials. Considerable interest has been shown in the use of heat of fusion type materials for storage of heat energy. Dr. Telkes proposed the use of these materials, and a system designed by her using Glauber's salt as the storage medium has been discussed. The melting temperature of Glauber's salt is about 88 F and its heat of fusion about 92 Btu per lb. Calculations for the temperature range of 80 to 100 F indicate that about 7.3 times as much heat may be stored in Glauber's salt as in an equal volume of water.

In order to determine what chemical compounds are presently available that might have possibilities as heat of fusion storage materials in the temperature range of 80-130 F (condenser side storage) and 40-60 F (evaporator side storage), a survey was made of chemical tables and some 40 compounds were found that had melting temperatures in one of these ranges. Both inorganic and organic materials were investigated. However, many of these materials were hazardous, many prohibitively expensive, and complete data lacking on others. No satisfactory material was found for evaporator side heat storage.

Table 5 shows physical properties and estimated cost data on four inorganic compounds suitable for condenser side heat storage. Of the materials shown, Glauber's salt has the least cost per million Btu.

Comparing the features of heat of fusion materials with those of the ideal storage medium indicates that these materials are excellent with regard to high heat capacity per unit volume, high heat capacity without large temperature change, and heat storage at moderately low temperature. However, the materials must be low cost, non-hazardous, and non-corrosive to be satisfactory. Several satisfactory materials are available for storage of heat on the condenser side of the heat pump but practically none are available for evaporator side storage. It will be shown in a forthcoming article that evaporator side heat storage is preferable. The solution probably lies in the synthesis of materials providing the proper chemical and physical properties and further research is needed in this direction. For example, one of the esters of isophthalic acid, diethyl isophthalate, has a freezing point of approximately 50 F and is probably non-corrosive and non-toxic, though its latent heat is low.

Because of undercooling and temperature stratification, not all of the theoretical heat capacity may be available in heat of fusion materials. In tests[18] conducted for the *Edison Electric Institute* and the *Association of Edison Illuminating Companies* using sodium phosphate dibasic ($Na_2HPO_4 \cdot 12\ H_2O$) results indicated that during the melting cycle 91 percent of the theoretical heat exchange was available and during the freezing cycle only 72 percent was available. However, additional research is necessary before definite conclusions can be made. Previous research[19] for these same organizations showed that the heat available depended on the shape of the container and that the best results were obtained with small diameter containers.

It is evident that additional research and development are necessary before heat of fusion materials may be applied most effectively. The advantages of this method are such that it appears to be the most promising for long-term heat storage.

Table 5 — Properties and Costs of Various Heat of Fusion Type Storage Materials[a, b]

Material	Chemical Formula	Melting Temp. F	Heat of Fusion Btu per lb	Density lb per cu ft	Latent Heat Capacity Btu per cu ft	Cost $ per ton	Cost $ per 10^6 Btu
Calcium Chloride	$CaCl_2 \cdot 6\ H_2O$	84.2	73.3	104.7	7,670	10	69
Calcium Nitrate	$Ca(NO_3)_2 \cdot 4\ H_2O$	107.8	61.2	113.3	6,950	50	410
Sodium Phosphate Dibasic	$Na_2HPO_4 \cdot 12\ H_2O$	97.0	120.0	94.8	11,400	37	154
Sodium Sulphate	$Na_2SO_4 \cdot 10\ H_2O$	87.8	92.4	91.0	8,400	12	65

[a] Physical properties taken from *Handbook of Chemistry and Physics,* 33rd. Ed., Chemical Rubber Publishing Co., Cleveland, Ohio, 1951.

[b] Costs calculated from data from *Current Market Quotations, Oil, Paint and Drug Reporter,* Vol. 163, No. 1, January 5, 1953, pp. 9-29.

Heat Pumps

Application of Heat Pumps to Year-Around Air Conditioning. The use of refrigerating equipment for winter heating as well as summer cooling has received much attention during recent years. The main advantages of the heat pump are that it is a non-combustion form of heating offering the maximum degree of cleanliness and safety and that the functions of heating and cooling are performed by the same system. The principal disadvantage of the heat pump in most parts of the country is its high operating cost for heating since its energy input is power which is generally more costly than fuel. In order for a heat pump to be competitive in operating costs with conventional fuel-fired systems, relatively cheap electricity and a relatively high temperature heat source for the heat pump are required. The use of solar energy as the heat source offers the distinct advantage of a higher temperature heat source than the presently available sources such as outdoor air, ground water, and the earth.

It is of major importance in the design and operation of heat pump systems to realize a high coefficient of performance in order to reduce operating costs. This requires not only a high temperature heat source but also the most advantageous cycle of operation. Practically all heat pump systems in use today employ a single-stage vapor compression cycle of operation. As shown in a previous article[20], the single-stage vapor compression system is ineffective thermodynamically for heating a fluid through a large temperature range since the condensing temperature of the refrigerant must be maintained higher than the exit temperature of the fluid heated, and thus a sizeable temperature difference exists in a large portion of the condenser. It was shown that the use of multiple condensers with flash chambers between allowed the refrigerant to condense in successive stages of lower pressure, thus reducing the mean temperature difference between the refrigerant and the fluid heated and resulting in a marked increase in coefficient of performance. Fig. 8, reproduced from this article, shows the improvement in theoretical coefficient of performance of multiple-step condensation systems compared to the single-stage vapor cycle.

Practical Coefficients of Performance of Heat Pumps. It is advantageous for design purposes to be able to analytically predict the coefficient of performance of actual heat pumps. Values found from an ideal cycle assumption are, of course, too high and it is difficult to know what multiplication factor is needed to give practical values. The following derivation is based upon the use of brake horsepower per ton values taken from manufacturer's rating tables. Two cases will be considered. These are the single-stage vapor compression heat pump and the heat pump arranged for two-step condensation using two condensers, two compressors, one flash chamber, one evaporator and one expansion valve. Heat loss from the compressor and its driving motor will not be included as part of the useful heat rejected.

For the single-stage heat pump

COP = Heat Rejected/ Power Required .... (12)

Heat Rejected in Btu per min = (R) (200) (Tons) ....(13)

Power Required in Btu per min = (42.4) (BHP)/η_m ....(14)

Substitution of Equations 13 and 14 in Equation 12 gives the result

COP = 4.72η_m R/(BHP/Ton) ....(15)

For the two-step condensation heat pump

COP = (Heat Rejected in Condenser 1 + Heat Rejected in Condenser 2)/(Power Required for Compressor 1 + Power Required for Compressor 2) ....(16)

It can be shown that

Heat Rejected in Condenser 1 in Btu per min = (200) $(\text{Tons})_1$ (R_1) $(h_e - h_{f,1})/(h_e - h_{f,2})$ ....(17)

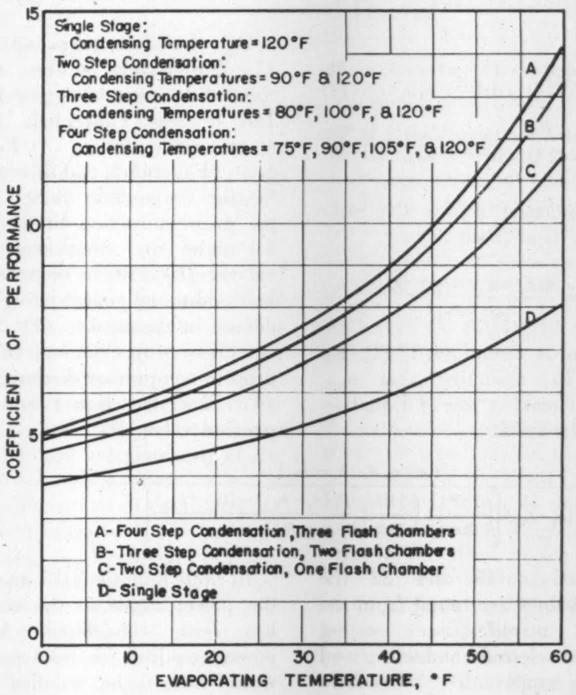

Fig. 8 — Theoretical heat pump cycle coefficient of performance for dichlorodifluoromethane (F-12) systems used for heating a fluid without phase change from 60 F to 120 F (for systems with equal heating steps in each condenser)

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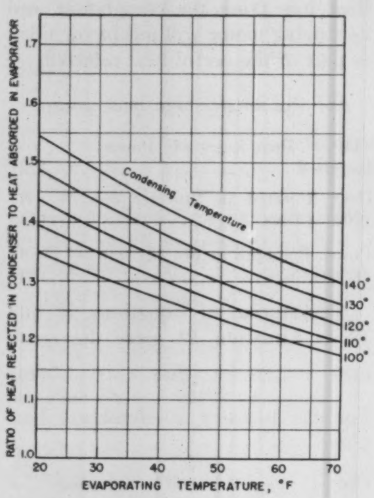

Fig. 9 — Ratio of heat rejected in condenser to heat absorbed in evaporator for a single-stage dichlorodifluoromethane (F-12) refrigeration system

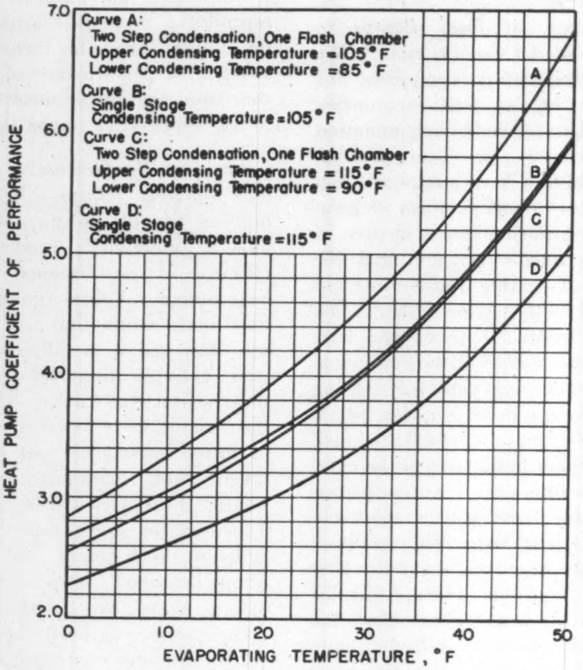

Fig. 10 — Practical coefficient of performance for dichlorodifluoromethane (F-12) heat pumps

Heat Rejected in Condenser 2 in Btu per min

$$=200\left[(\text{Tons})_2 R_2+(\text{Tons})_1 \frac{(h_{f,1}-h_{f,2})}{(h_e-h_{f,2})}\right] \text{-----} (18)$$

Power Required for Compressor 1 in Btu per min = (42.4) $(\text{BHP})_1/\eta_{m,1}$ ....(19)

Power Required for Compressor 2 in Btu per min = (42.4) $(\text{BHP})_2/\eta_{m,2}$ ....(20)

If each condenser rejects the same quantity of heat, then

$$\frac{(\text{Tons})_2}{(\text{Tons})_1}=\frac{R_1(h_e-h_{f,1})-(h_{f,1}-h_{f,2})}{R_2(h_e-h_{f,2})} \text{---} (21)$$

Substitution of Equations 17-20 into Equation 16, assuming that $\eta_{m,1} = \eta_{m2}$, and making use of Equation 21, gives the result

$$COP=\frac{9.43\,\eta_m R_1\,(h_e-h_{f,1})}{(h_e-h_{f,2})\left[\left(\frac{\text{BHP}}{\text{Ton}}\right)_1+\left(\frac{\text{BHP}}{\text{Ton}}\right)_2 \frac{R_1(h_e-h_{f,1})-(h_{f,1}-h_{f,2})}{R_2(h_e-h_{f,2})}\right]} \text{-----} (22)$$

In Equations 15 and 22 the BHP/Ton values are found from the compressor manufacturer's rating tables at the selected condensing and evaporating temperatures. The ratio *R* which is the ratio of the heat rejected in the condenser to the heat absorbed in the evaporator is found from Fig. 9 which was constructed using the following assumptions: (1) Single-stage system using dichlorodifluoromethane (F-12) (2) Ten degrees Fahrenheit superheat at evaporator outlet; (3) Fifteen degrees Fahrenheit additional superheating in suction line; (4) Two psi drop in suction line; (5) Four psi drop in compressor suction valves; (6) Fifteen degrees Fahrenheit additional superheating in cylinder on intake stroke; (7) Isentropic compression in cylinder; (8) Six psi drop in compressor discharge valves; (9) Saturated liquid entering expansion valve.

In both Equations 15 and 22 only the power input to the compressor has been considered. Additional power required for fans, pumps, etc. would have to be included to arrive at a system coefficient of performance.

Fig. 10, calculated by Equations 15 and 22, shows the practical coefficient of performance for single-stage and two-step condensation di-

Heat Pump Nomenclature

BHP = brake horsepower input to compressor, horsepower.
BHP/Ton = ratio of brake horsepower input to tons of refrigeration, horsepower per ton.
$(\text{BHP/Ton})_1$ = BHP/Ton for compressor operated at higher discharge pressure, horsepower per ton.
$(\text{BHP/Ton})_2$ = BHP/Ton for compressor operated at lower discharge pressure, horsepower per ton.
COP = coefficient of performance, dimensionless.
h_e = enthalpy of vapor at evaporator outlet based upon ten degrees of superheat, Btu per pound.
$h_{f,1}$ = enthalpy of saturated liquid at higher condensing temperature, Btu per pound.
$h_{f,2}$ = enthalpy of saturated liquid at lower condensing temperature, Btu per pound.
R = ratio of heat rejected in condenser to heat absorbed in evaporator, dimensionless.
R_1 = value of R for higher condensing temperature, dimensionless.
R_2 = value of R for lower condensing temperature, dimensionless.
η_m = efficiency of electric motor and drive, dimensionless.

chlorodifluoromethane (F-12) heat pumps based upon an assumed motor efficiency of 85 percent. At the higher evaporating temperatures the two-step condensation system has a coefficient of performance in the range of 15 to 20 percent greater than the single-stage system whose condensing temperature is equal to the upper condensing temperature of the two-step system. Since evaporating temperatures of 50 F or higher are possible with solar energy-heat pump systems, Fig. 10 shows that relatively high coefficients of performance of six or more may be expected.

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ESSENTIALS OF ENGINEERING THERMODYNAMICS

by H. J. Stoever

A complete, one semester course for engineering students in an abridged version of engineering thermodynamics will be found in Prof. Herman J. Stoever's newly published book *Essentials of Engineering Thermodynamics*. This book is divided into three parts, with divisions made according to the thermodynamic principles involved rather than according to the kinds of systems involved.

Part I deals with the First Law of Thermodynamics, Part II is devoted to the Second Law, and Part III deals with applications of the principles and methods developed in the first two parts. This arrangement makes it possible to include in a single assignment problems which are similar in nature, but which involve different kinds of systems; perfect gases in some and steam in others, for example.

The abridgement has been made possible by carefully rewriting articles dealing with temperature; deleting certain topics, such as the material on *variable specific heats* and *internally reversible processes;* deleting certain paragraphs dealing with non-essential materials; and omitting certain proofs.

Each of the chapters in Part III is complete in itself, and therefore each can be used independently of the others; or any of them may be omitted without loss of continuity, as the instructor desires.

According to Professor Stoever, one of the most effective devices for helping students understand new principles or methods is to require them to solve problems in which they must apply these principles or methods. For this reason he has inserted problems after more than half the articles, which is one of the outstanding features of this text book. Of the 381 total, 50 have been prepared specially for this book, while the remainder have been taken from the original work and represent classroom tested exercises. All problems are designed to maintain student interest and to drive home concepts and principles brought out in the text.

PIONEER IN PANEL HEATING DIES AT 76

J. L. Musgrave who, together with R. G. Crittall, prepared the preliminary designs for the panel heating installation in the British Embassy in Washington, died at his home in Swanage, Dorset, England, on November 23, 1953, at the age of 76. The British Embassy installation, made back in the '30s, was the first hot water panel heating installation in the United States.

The late Mr. Musgrave was a former president of the *Institution of Heating and Ventilating Engineers*. His son, Barrington LeB. Musgrave, lives in New York City.

JOURNAL SECTION

Skyline view showing portion of business section of Houston

Houston—America's Industrial Frontier Site of ASHVE 60th Annual Meeting

HOUSTON, TEX., industrial and shipping capital of the fast growing Southwest Empire region will be the center of interest for Society members from January 25-27, 1954. These dates mark the occasion of the 60th Annual Meeting of the Society to be held in the South's largest city.

Headquarters for the meeting, which is expected to attract over 1200 members and guests, will be at the Rice Hotel. D. M. Mills, general chairman of the Committee on Arrangements, announces that plans are complete to insure a pleasant visit and long-to-be-remembered meeting for everyone. Every detail has been considered so that ASHVE members will recall their journey to the booming Southwest and the great State of Texas with fondness.

The four technical sessions will provide a variety of papers covering nearly all interests. The ladies committee has planned a diverting program for the fair sex during the daytime, while there will be entertaining events for the members and their wives in the evenings.

The program for the meeting, together with the Special Events Reservation Form containing details, was sent to all members in November. Members and their guests who made advance reservations will make a post-meeting trip to Mexico, at which time they will visit Mexico City, Xochomilcho, Cuernavaca, Acapulco, and other points of interest.

The Committee on Arrangements which has arranged the entertainment features of the Program, and the Program and Papers Committee, together with the Officers and Council of the Society hope as many members, their families and friends, as possible plan to visit Houston for the Society's 60th Annual Meeting.

A complete program of technical sessions, committee meetings and entertainment events is shown on the following pages.

At the technical sessions, papers of interest to many different groups will be presented and among the subjects to be discussed are cooling towers, automobile air conditioning, panel heating, heat pump and solar energy studies, year 'round air conditioning residence cooling and a new radiometer.

In addition to the Council and Committee on Research, there will be meetings of the Finance and Executive Committees, the Chapters Conference Committee, the TAC's on Plant and Animal Husbandry, Weather Data, Heat Pump, Evaporative Cooling, Sorption, and the Nominating Committee.

The entertainment program, which gets underway with a motor tour of Houston's residential section Sunday afternoon, followed by coffee Texas Style at the Rice Hotel, will include the traditional Welcome Luncheon on Monday with greetings from Mayor Roy Hofheinz of Houston, and Morris Frank of the *Houston Chronicle* as toastmaster.

Monday afternoon there will be a bus or boat trip to San Jacinto Monument for the visitors with an opportunity to see the battleground and the famous battleship Texas. An excellent dinner will be served family style at the San Jacinto Inn which adjoins the battlegrounds.

The ladies will be occupied on Tuesday with a luncheon and fashion show while the men will want to take

[*Continued on page 204*]

PROGRAM — 60th ANNUAL MEETING

THE AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS
Rice Hotel, Houston, January 25-27, 1954

Sunday — January 24

10:00 a.m.	REGISTRATION—Mezzanine Floor—Lounge
10:00 a.m.	Council Meeting
10:00 a.m.	Committee on Research
2:00 p.m.	Motor tour through beautiful residential section of Houston
4:00 to 6:00 p.m.	Rendezvous for coffee Texas style—Sam Houston Room
Hostesses:	Mrs. Reg. F. Taylor. Assisted by: Mmes. E. G. Floeter, Jr., J. W. Holland, J. C. Lewis, F. M. Neil, O. G. Rivoire, A. B. Ullrich, Jr.
7:00 p.m.	For your pleasure a group of tables have been reserved for Dinner, Floor Show and Dancing at the Shamrock Hotel. (Reservations required two weeks in advance. No set price—pay your own check)

Monday — January 25

9:00 a.m.	REGISTRATION—Mezzanine Floor—Lounge.
9:00 a.m.	Hospitality Room—Sam Houston Room—Hosts, North Texas Chapter, Dallas
9:30 a.m.	FIRST TECHNICAL SESSION—Ballroom Call to Order—By Reg. F. Taylor, President Greetings by D. M. Mills, General Chairman Report to Officers and Council Amendments to By-Laws L. T. Mart, Chairman Prediction of Cooling Tower Performance, by W. W. Smith Automobile Air Conditioning—Progress and Problems, by P. J. Kent Pressure Loss of Air Flowing Through 45-Degree Wooden Louvers, by P. R. Cobb
12:30 p.m.	Welcome Luncheon—Ballroom—E. G. Floeter, Jr., president, South Texas Chapter presiding Toastmaster: Morris Frank Welcome to Houston: Mayor Roy Hofheinz
2:00 p.m.	Chapters Conference Committee Meeting
2:00 p.m.	TAC on Heat Flow Through Glass, R. A. Miller, Chairman
2:00 p.m.	TAC on Plant and Animal Husbandry Meeting, A. J. Hess, Chairman
2:30 p.m.	Boat and bus trip to San Jacinto Monument—See Ship Channel, Industrial District; Visit Battle Ground and Battleship Texas
3:00 p.m.	TAC on Weather Data Meeting, John Everetts, Jr., Chairman
6:00 p.m.	Dinner at San Jacinto Inn (served family style). Return to Rice Hotel by bus at 8:30 p.m.

Tuesday — January 26

9:00 a.m.	REGISTRATION—Mezzanine Floor—Lounge
9:00 a.m.	Hospitality Room—Hosts, Southwest Texas Chapter, San Antonio
9:30 a.m.	SECOND TECHNICAL SESSION—Ballroom Call to Order—L. N. Hunter, 1st Vice President Report of Committee on Research—R. S. Dill, Chairman P. B. Gordon—Chairman Circuit Analysis Applied to Load Estimating, by H. B. Nottage and G. V. Parmelee Heat Flow Characteristics of Hot Water Floor Panels, by E. L. Sartain and W. S. Harris Effects of Non-Uniformity and Furnishings on Panel Heating Performance, by L. F. Schutrum and C. M. Humphreys Field Studies of Floor Panel Control Systems, Part II, by A. B. Algren, E. F. Snyder, Jr., and R. R. Head Report of Tellers of Election

Method of Choosing Location of, Financing and Conducting Meetings of the Society

Resolved: That inasmuch as the Annual and Semi-Annual Meetings of the Society come under the jurisdiction of the Council, the following rules governing the handling of such meetings be adopted by the Council and published in the JOURNAL of the Society at least twice during every year, preferably just prior to each meeting.

1—The Council will select the city in which the Annual or Semi-Annual Meeting is to be held, giving due consideration to the invitations received from Chapters or members as well as to the advisability of so distributing those meetings as to make them of the greatest advantage to the general membership, and to reduce as far as possible the expense of members attending.

2—That an appropriation be made to cover the entertainment or local expenses, incurred in connection with the meeting, and the regular meeting expenses to be taken care of by the General Fund of the Society in the regular way.

3—That no registration fee or compulsory obligations of any nature be imposed on members or guests.

4—That the purchase of tickets for banquets or for any other form of entertainment that may be provided be entirely voluntary.

5—That the grouping of features and the sale of tickets for group features be discouraged.

6—That the raising of funds from manufacturers of heating apparatus be discouraged.

7—That the display of samples, or of literature, advertising the product of any manufacturer in any way, shape or form, be not permitted at the booths, registration desk, or in or about the meetings.

8—That the distribution of trade papers be entirely at the discretion of the committee in charge.

9—That the local Chapter or local members be empowered to form a General Committee with such sub-committees as may be required to handle the details of transportaion, hotel accommodations, entertainment, finance, etc., and that this General Committee be requested to confer frequently with the Council, through the Executive Secretary of the Society, and to make frequent reports on progress in connection with the various matters being handled by them.

10—That the arrangements of elaborate and costly entertainment features be discouraged.

Adopted at Council Meeting, January 29, 1926.

12:30 p.m. Ladies Luncheon and Fashion Show—Empire Room
1:30 p.m. Nominating Committee Meeting
2:00 p.m. TAC on Evaporative Cooling, A. J. Hess, Chairman
2:00 p.m. Inspection trips to Public, Industrial and Business Buildings

1. Hughes Tool Co. and Gulf Brewing Co.
2. Houston's new Medical Center showing several types of heating and air conditioning installations. Also new Prudential office building.
3. Sugarland Industries — Imperial Sugar Co. at Sugarland, Tex. See sugar refined from stalk to sugar sack.
4. Schlumberger Well Surveying Corp. (new and modern plant)

7:00 p.m. Dinner a la Mexicaine—Ballroom
7:00 p.m. Past Presidents' Dinner
8:00 p.m. Informal entertainment—Movies, TV shows—Cards (Mezzanine Floor)

Wednesday — January 27

9:00 a.m. REGISTRATION—Mezzanine Floor—Lounge
9:00 a.m. Hospitality Room—Sam Houston Room—Hosts, West Texas Chapter, Lubbock, Tex.

9:30 a.m. THIRD TECHNICAL SESSION—Ballroom
Call to Order by John E. Haines, 2nd Vice President
Prof. B. H. Jennings, Chairman
Costs of Operating the Heat Pump in the Equitable Building, by J. D. Kroeker and R. C. Chewning
Availability and Utilization of Solar Energy, by R. C. Jordan and J. L. Threlkeld
Part 1. Solar Energy Availability for Heating in the United States
Part 2. Utilization of Solar Energy for House Heating
Part 3. Design and Economics of Solar Energy Heat Pump Systems
Effects of Air Conditioning on Plant Growth, by F. W. Went
12:00 noon Luncheon Meeting—TAC on Sorption, G. L. Simpson, Chairman

1:30 p.m. Ladies Theater Party (Playhouse Theater) Buses leave Rice Hotel at 1:30 p.m. Curtain time 2:00 p.m.

2:00 p.m. FOURTH TECHNICAL SESSION—Ballroom
Call to Order—Reg. F. Taylor, President
W. A. Grant, Chairman
Room Air Distribution Research for Year 'Round Air Conditioning—Part II, Supply Outlets at Three Floor Locations, by H. E. Straub and S. F. Gilman
Cooling a Small Residence Using a Perimeter-Loop Duct System, by D. R. Bahnfleth, C. F. Chen and H. T. Gilkey
A Two-Sphere Radiometer, by D. J. Sutton and P. E. McNall, Jr.
Unfinished Business
New Business
Resolutions

7:00 p.m. Annual Banquet—Ballroom
Toastmaster: Dr. Baldwin M. Woods
Invocation
Presentation of F. Paul Anderson Medal to Walter L. Fleisher
Installation of Officers
Presentation of Past Presidents' Emblem to Reg. F. Taylor
Speaker: Dr. Walter W. Kemmerer, Executive Director of the Houston World's Fair
Subject: An Educator Looks at Air Conditioning

Thursday — January 28

9:30 a.m. Organization Meeting of Council

[*Continued from page* 202]

advantage of the opportunity to inspect some of the air conditioning installations which have helped earn for Houston the title *America's Most Air Conditioned City.*

Informal entertainment at the Rice Hotel is on the agenda for Tuesday night while Wednesday afternoon will see the ladies enjoying the Theater Party at the Playhouse Theater.

The meeting will come to a fitting climax on Wednesday night when the 60th Annual Banquet is held in the Rice Hotel ballroom. Dr. W. W. Kemmerer, Executive Director of the Houston World's Fair will discuss *An Educator Looks at Air Conditioning.* Dr. Baldwin M. Woods will be toastmaster and Walter L. Fleisher will receive the F. Paul Anderson Medal for 1953 from Pres. Reg. F. Taylor. The Banquet will also feature the installation of the new Society officers, the presentation of the Past President's emblem to Reg. F. Taylor and will be followed by dancing.

All indications point to a well-attended meeting in the Lone Star State. Plan to come. See you there!

Steam and Hot Water Research

At the December meeting of the Technical Advisory Committee on Hot Water and Steam Heating, of which John W. James is Chairman, held at Northwestern University, Evanston, Ill., the Committee saw a demonstration of the apparatus used in the investigation of piping noises; considered a progress report on the work in progress; the future program on metastable state studies; and considered a project on air entrainment and venting hot-water systems.

Professors B. H. Jennings and W. L. Rogers reported that the work planned on the metastable state indicates that a significant trend should be obtained in March or April, which will permit determination of the future program. The work on piping noises is a pioneer study in determining noise that occurs inside of a piping system. It is anticipated that pattern curves can be developed to give fundamental data to the engineer for design purposes.

A paper is planned for the Semi-Annual Meeting 1954.

The current year's budget for these cooperative projects is $5,500 and pledges received to date for this research are about half this amount, so that further support is needed at this time.

W. L. Fleisher to Receive 1953 F. Paul Anderson Award

THE COUNCIL of the Society takes great pleasure in announcing the 1953 Award of the F. Paul Anderson Medal to Walter L. Fleisher, New York, N.Y., Past President and Life Member of ASHVE, in recognition of his outstanding contributions to the advancement of heating, ventilating and air conditioning in the field of human comfort.

The award will be formally presented at the 60th Annual Meeting of the Society in Houston, Tex., on January 27, 1954, by Pres. Reg. F. Taylor.

Comfort conditioning has been a subject closely identified with Mr. Fleisher since the beginning of his professional career in 1903. In that year he supervised the engineering of the ventilating system for the New Amsterdam Theater, and in succeeding years designed, supervised, or installed systems in the Shubert, Ames, Forty-fourth Street, Fulton, and Maxine Elliot in New York, and many others in Chicago, St. Louis and Newark, N.J. One of the first applications of refrigeration for cooling a theater was made under his supervision at the Hippodrome Theater in New York.

Professional Career

Mr. Fleisher, who was born in Philadelphia on July 18, 1880, was graduated from the University of Pennsylvania in 1900 and received his M.S. there in 1901. He was given an honorary M.E. degree by the university in 1931.

His engineering career began with his association as engineer-in-chief for Francis Bros. and Jellet, Philadelphia, a position he left in 1911 to form W. L. Fleisher & Co., Inc., which he served as president-treasurer and chief engineer until it was merged with two other companies under the name of The Cooling and Air Conditioning Corp. In 1930 he established a consulting office in his name in New York for patent experting, industrial analysis and advisory work. He organized the Air & Refrigeration Corp. in 1934 and has been its president for the past 20 years.

Many Society Activities

In addition to serving as president, vice president and second vice president of the Society in 1941, 1940, and 1939 respectively, and as a member of Council from 1936-42, Mr. Fleisher has been on numerous other ASHVE Committees. Among the committees which he headed or served on were: Executive, Finance and Membership from 1936-1941; Chairman, Committee on Research 1938-39, and member of Committee on Research 1935-40; Chairman and member of several Technical Advisory Committees in 1935-36-38-40-41; Guide Publication Committee chairman 1933-34 and member 1931-32 and 1935; served on several Special Committees from 1921 to 35; Chairman of F. Paul Anderson Award Committee 1940.

As chairman of the Guide Publication Committee in 1934 he introduced several new features and directed the editorial policy of THE GUIDE. Mr. Fleisher also has been extremely active in affairs of the New York Chapter for many years and served as president in 1920-21.

Leader in Air Conditioning

Mr. Fleisher's leadership in the field is evidenced by his holding over 100 patents in this and foreign countries in the fields of cooling, ventilating, controlling, cleaning, drying and processing. He designed the first theater cooling system employing an air washer for the Fulton Theater in New York. With Dr. W. H. Carrier he gave comfort conditioning its first big development in the air conditioning of the J. L. Hudson store and others in Detroit in 1925. This marked the beginning of the wide use of the by-pass system of air conditioning for comfort. He invented the capillary conditioner and patented the so-called local recirculation system in which the fresh air is intensively conditioned to create a recirculation at the point of discharge.

His present activities attest to Mr. Fleisher's continuing interest in the field of human comfort. He is chairman of the ASHVE, *ASRE*, *ASME*, *ARI* and Medical Profession Joint Committee for the Revision of the Code of Minimum Requirements for Comfort Air Conditioning.

Together with Rear Adm. Morgan Watt and Comdr. T. H. Urdahl, he was responsible for important improvements in the habitability of warships during World War II.

In addition to his Society activities, Mr. Fleisher headed the Standards Committee of the *HPACCNA* when codes were being developed for computing the heating and ventilating requirements of buildings. He is a fellow of the *ASRE;* a member of *American Society of Bakery Engineers;* Life Member of *American Society of Mechanical Engineers* (Education Advisory Council); member of Princeton University's Engineering Advisory Board; chairman of Advisory Committee to the Department of Air

Pollution Control of New York City; *National Fire Protection Association;* a member of the Princeton Club and the New York Academy of Sciences.

His home, Saw Mill Farm in New City, N. Y., is an original Queen Anne grant dating from 1717. Mr. Fleisher is a collector of antiques, a patron of the arts and is an amateur painter of note.

Twelfth Recipient of Award

The F. Paul Anderson Award was established in 1930 by a gift of the late Thornton Lewis of Philadelphia, president of the Society in 1929, and named for the late Dean F. Paul Anderson of the University of Kentucky, who served as Society president in 1927.

The first recipient of the F. Paul Anderson Award was the late Dr. W. H. Carrier in 1932, and Mr. Fleisher will be the twelfth to receive the award which has also been presented to: Dr. Arthur Cutts Willard (1935); Prof. F. B. Rowley (1938); Dr. F. E. Giesecke (1941); Comdr. Ferry C. Houghten (1943); Capt. Alfred E. Stacey, Jr. (1945); James H. Walker (1946); Dr. C.-E. A. Winslow (1949); Samuel R. Lewis (1950); Dr. Homer Addams (1951); Everett N. McDonnell (1952).

Dorothy Mildner Celebrates 30th Anniversary with ASHVE

Dorothy Mildner on her 30th Anniversary with ASHVE Headquarters

Since November 1923, Dorothy Mildner has been on the job at ASHVE Headquarters and through her years of loyal and cheerful service she is well known to thousands of members.

To fittingly observe her 30th anniversary with the Society she was the guest of honor at a surprise luncheon on November 16 at the Arkwright Club, New York. With her associates in the headquarters office present, Pres. Reg. F. Taylor expressed the appreciation of the Society and told of the esteem and respect in which she is held. In a well deserved tribute for the long and faithful service she has given the organization, President Taylor said:

> "We are gathered here this noon to honor Miss Mildner, and to show our respect, love and admiration for her. In a day or two, she will have completed 30 years in the service of the Society, and I am sure that every officer, council member, committee member and Society member with whom she has been in contact is appreciative of those services.
>
> "When she became associated with the Society in 1923, there were but 1600 or 1700 members, and she has assisted in its growth through the years until there are now some 9200 members. She helped it through the depression years and her devotion to duty, I think, sets a very good example to all of us. Her loyalty to the Society is something the Society can be, and is, proud of.
>
> "Through my official connection with the Society the past seven years, it has been my privilege to be more closely associated with Miss Mildner, and I can testify to the fact that even with the harassing work at meetings, she has always been efficient and maintained a poise soothing to the most savage beast.
>
> "Being here today is indeed a pleasure, although an unexpected one, and I deem it a privilege to be present. I can congratulate the Society on having such a faithful devotee in its personnel, and I congratulate Miss Mildner on the completion of 30 years of what I suppose you would call, just plain work. Miss Mildner, I certainly wish you the best of luck and happiness for the years yet to come."

Miss Mildner made a brief response saying that the years had passed quickly and that she had enjoyed her work, but that she could not have carried on these many years without the splendid cooperation of her associates. She also said that she had many pleasant recollections of the years which had recorded the Society's greatest progress and growth, and that she was happy to have made her contribution.

The members of the staff at the Headquarters office join with President Taylor in extending their best wishes to Miss Mildner for continued good health and happiness for many, many years.

Dorothy Mildner at ASHVE Headquarters office with A. V. Hutchinson, executive secretary, and Reg. F. Taylor, president

Honored by Life Membership

E. J. Burns
St. Paul, Minn.

EDWARD J. BURNS, vice president of Reuben L. Anderson, Inc., St. Paul, Minn., was born in Minneapolis, Minn., October 19, 1888.

He attended local grade and high schools from which he graduated in 1908. After leaving school, he was with H. Keely and Co., until 1933 when he began working with the Donovan Construction Co. In 1941 Mr. Burns joined Reuben L. Anderson, Inc., supervising the mechanical work in many large projects handled by this firm throughout the United States.

Mr. Burns joined the Society in 1923 and has always been active in the Minnesota Chapter, of which he is a member.

C. H. Hagedon
Indianapolis, Ind.

CHARLES H. HAGEDON, a partner with S. E. Fenstermaker and Co., Indianapolis, Ind., joined the Society in 1919 as a member. He is a charter member of the Indiana Chapter and one of its active members.

Born on December 9, 1888, at Indianapolis, Ind., Mr. Hagedon attended Manual Training High School in Indianapolis, graduating in 1907. In 1914 he became associated with S. E. Fenstermaker and Co., who at that time represented Warren Webster and Co., manufacturers of heating equipment. In 1925 he was admitted to the firm as a partner.

CHARLES S. WILMOT, Narberth, Pa.—Consulting engineer, was born March 15, 1888, in Haddonfield, N. J. After completing technical and business administration courses, he did sales, engineering and contract work for 12 years. From 1918 to 1920 he was employed by the government in ordnance work, leaving it in 1921 to join the Monitor Radiator Co. as sales engineer and plant manager. He was appointed sales and plant manager of the Metal Castings Co. in 1925 and from 1926 to 1931 he was a consulting and project engineer for the Day & Zimmermann Engineering & Construction Co. Prior to opening his own architectural and industrial consulting practice he was in charge of sales and contracting work for the Building Insulation Co.

Mr. Wilmot, who has been a member of the Society since 1919, is also a member of *ASME*.

HOWARD E. SPROULL, Cincinnati, Ohio—Has taken an active interest in Society affairs since joining in 1920. He has served on various committees, including the Chapter Relations Committee, the Chapter Delegates Committee, Nominating Committee, and as chairman and member of the Constitution and By-Laws Committee. He was elected to membership on the Council in 1948, in which capacity he served on the Finance Committee. He is currently chairman of the Executive Sub-Committee of the Council.

Born in New Alexandria, Pa., on June 6, 1888, Mr. Sproull attended high school and business college in Bedford, Ind., and was graduated in 1912 from Purdue University. His association with the American Blower Corp., of which he is division sales manager, began the year prior to receiving his mechanical engineering degree. He served as sales engineer and branch manager before his appointment as division sales manager.

H. E. Sproull
Cincinnati, Ohio

EDGAR F. WENDT, president of Buffalo Forge Co., Buffalo, N. Y., was born in Buffalo, N. Y., November 6, 1888. Educated in local grade and high schools, he attended Cornell University from which he was graduated with a degree in mechanical engineering in 1911.

Entering a subsidiary of Buffalo Forge Co., (Buffalo Pumps, Inc.) upon graduation, Mr. Wendt served there for several years, then was transferred to the Squier Division of Buffalo Forge Co. and eventually became sales manager of the division. In 1916 in a reorganization of Buffalo Forge Co., Mr. Wendt became vice president, and president in 1929.

E. F. Wendt
Buffalo, N.Y.

Summary of Chapter Meetings*

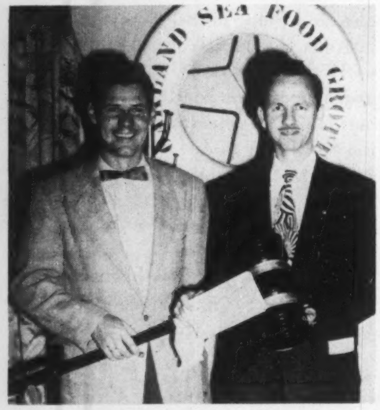
GOLDEN GATE CHAPTER HONORS SACRAMENTO GROUP ON FIRST ANNIVERSARY

A joint meeting of the two chapters was held on November 5 in Oakland. The officers of both chapters were introduced and a birthday cake was presented to the Sacramento group on the occasion of its first anniversary. Presiding officer, Pres. H. E. Murray of the Golden Gate Chapter, presented the cake to the Sacramento Valley Chapter.

Pres. E. C. McKinsey of Sacramento Valley Chapter presented President Murray with an oversized gavel. In tribute to his being the first president of the Sacramento Valley Chapter, L. A. O'Meara was presented with a gavel as a keepsake.

A panel discussion on *Double Duct Air Conditioning Systems* occasioned much interest. The panel was composed of Leo Dwyer of Clyde E. Bentley, design; George Rhoda of Robert Stanton, architectural; W. W. Cockins, of Scott Co., mechanical contracting; and E. F. Dill, Minneapolis-Honeywell Regulator Co., controls. A lively question and answer session followed the discussion. Attendance 154.

J. N. Moore presents gavel to L. A. O'Meara as a memento of his being the first president of Sacramento Valley Chapter



E. C. McKinsey, president of Sacramento Chapter, presents "gavel" to J. E. Murray, president of Golden Gate Chapter

Joint meeting of Golden Gate and Sacramento Valley Chapters *(l. to r.)* E. F. Dill W. W. Cockins, Dudley Deane, L. E. Dwyer, George Rhoda

- *ARKANSAS:* The November meeting of the Arkansas Chapter was called to order at the Sam Peck Hotel and was presided over by Pres. Herman Cumnock.

C. P. Kulp, manager of the Little Rock office of USF & G Co. was the guest speaker of the evening. He explained in detail the various types and forms of bonds and casualty insurance as connected with the construction industry. An informative question and answer period followed.

E. N. Pettit was presented with a past president's pin after which the meeting was adjourned. Attendance 25. Attendance ratio 0.33.

- *ATLANTA:* The November meeting of the Atlanta Chapter was held at Mammy's Shanty Restaurant and was called to order by Pres. J. G. Croley. President Croley brought to the attention of the Atlanta Chapter the plans for the forthcoming 60th Annual Meeting in Houston and also discussed and answered questions concerning the Mexico trip.

J. A. Marshall, program chairman, introduced H. F. Henry, partner in Acousti Engineering Co., guest speaker of the evening. Mr. Henry spoke on *Basic Principles of Sound and Sound Control* and his talk was greatly enjoyed by all. Attendance 45. Attendance ratio 0.36.

- *BALTIMORE:* Pres. H. D. Glaser called the November meeting to order at the Park Plaza Hotel. In the absence of R. W. Pentecost, treasurer, President Glaser gave the financial report.

F. M. Hewitt, program chairman, introduced the guest speaker, Reg. F. Taylor, Society president and consulting engineer, Houston, Tex.

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*Note: The attendance ratios shown represent the membership attendance divided by the chapter membership. These ratios will be useful as a partial indication of interest shown by local chapter members in various types of subjects programmed by the various chapters and may be useful in deciding on subjects for chapter meetings.

Reg. F. Taylor
Houston, Tex.

Mr. Taylor gave a general report on the activities and growth of the Society and he also presented a discussion concerning the problems in design of air conditioning. A description of Mr. Taylor's own residential cooling system was given and it was stressed that natural gas was used in operating this system. This important and timely talk was received with great interest. Attendance 53. Attendance ratio 0.48.

• *BRITISH COLUMBIA:* The November meeting was called to order by Pres. C. W. Leek at the Quadra Club. The minutes of the previous meeting were read and approved after which President Leek held a brief discussion on the Model By-Laws for ASHVE Chapters which were prepared by the Society's Charter & By-Laws Committee. H. J. Rosenberg moved that they be adopted as prepared by the committee and that they be forwarded to Society headquarters in New York.

J. H. Fox, Society Council member, was introduced by M. E. Minaker. Mr. Fox, general sales manager of Minneapolis-Honeywell Regulator Co., Toronto, Ont., presented a very interesting talk on three subjects: *Activities of the ASHVE*; *The East-West Canadian Industrial Picture*; and *The Mechanical Equipment Features of the Manufacturers Life Building*. An informative discussion followed. Attendance 43. Attendance ratio 0.54.

• *BRITISH COLUMBIA:* The October meeting was held at the Quadra Club and called to order by Pres. C. W. Leek. The following chairmen were heard from: R. D. Hale, program committee; A. C. Martin, publicity committee; R. W. Hole, attendance committee; M. E. Minaker, membership committee; and C. Van Boeyen, finance committee.

President Leek presented a past president's pin to M. E. Minaker and sincere thanks were given for his work in forming the British Columbia Chapter.

President Leek introduced the guest speaker, H. B. McLean of Vancouver. Mr. McLean, widely known handwriting expert, gave a fascinating and humorous talk on forgeries. Attendance 31. Attendance ratio 0.48.

• *CENTRAL NEW YORK:* The October meeting was called to order by Pres. C. R. Acheson at the University Club of Syracuse. The minutes of the previous meeting were read and approved, followed by reports from the treasury, program, and membership committees.

H. G. Strong introduced the new officers: C. R. Acheson, president; F. D. Putnam, vice president; H. K. Ormsby, secretary; and L. A. Childs, treasurer. A past president's pin was presented to retiring president F. E. Krell by J. H. Carpenter and in turn Mr. Krell presented Miss Mary Baker with a fountain pen for her services and cooperation in connection with the Chapter.

E. P. Palmatier, research project engineer, Carrier Corp., Syracuse, speaker of the evening, talked about *New Application Techniques for Residential Air Conditioning* and presented figures as to heating and cooling loads as well as costs for several cities on year 'round air conditioning. An interesting and enjoyable evening was had by everyone and special appreciation was given to Mr. Palmatier for his fine discussion. Attendance 64.

• *CENTRAL OHIO:* Pres. N. T. Hess called the November meeting to order at the Fort Hayes Hotel and proceeded to read the minutes of the previous meeting.

Robert Manahan, local manager of Johns-Manville Sales Corp., presented a fine talk on *Underground Asbestos Products* which was illustrated by a film.

The meeting then adjourned to the Seneca Hotel where an excellent talk entitled *Application and Operation of Controls* was presented. Attendance 42. Attendance ratio 0.30.

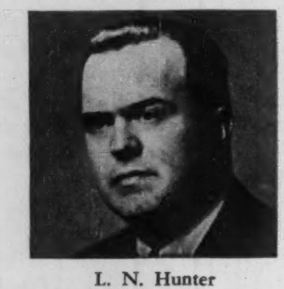
• *CENTRAL OHIO:* The Central Ohio Chapter held its October meeting at the Fort Hayes Hotel and the meeting was presided over by Pres. N. T. Hess. A. I. Brown, professor of mechanical engineering at Ohio State University, Columbus, Ohio, was presented with a Chapter Life Membership by Past President J. D. Slemmons.

A very interesting discussion of the *Small Pipe Duct Heating and Cooling System* was presented by a panel which was lead by J. I. Trimble, serving as chairman. Attendance 79. Attendance ratio 0.54.

• *CINCINNATI:* The November meeting was held at the *Engineering Society of Cincinnati* and was presided over by Pres. R. C. Beineke. Reports were presented by the following: Financial — R. G. Anderson; Program — W. H. Rieger; Christmas party — E. A. Sobolewski; Publicity — R. F. O'Conner; and details of the Society's Fall Council Meeting were presented by A. W. Edwards. Committee finances were discussed and referred to the Board of Governors. The meeting concluded with an address by Charles Gruber, Cincinnati Smoke Inspector, who spoke on *Smoke Abatement*. Attendance 40. Attendance ratio 0.34.

• *DELTA:* The November meeting of the Delta Chapter was called to order at the Engineers Club by Pres. H. L. Salaun. President Salaun read the announcement of the dates when the West Texas and Arizona Chapters will receive their charters and reported that a message of encouragement and congratulations would be sent to each.

C. B. Gamble presented the speaker of the evening L. O. Paul, vice president of Narowetz Heating and Ventilating Co., who spoke on *Modern Trends in Sheet Metal Construction.* Mr. Paul emphasized the harmony that is needed between the contractors and engineers in order to turn out the work. He presented a very interesting talk and his message was well received. Attendance 67.



L. N. Hunter
Johnstown, Pa.

• *DELTA:* Pres. H. L. Salaun called the October meeting to order at the Engineering Club. The minutes of the previous meeting were read and approved and a financial report was presented by J. J. Friedler, Jr.

President Salaun called upon L. N. Hunter, 1st vice president of the Society, who was a guest of the Chapter, and who made a few remarks about the Society. Mr. Hunter highlighted the Society budget, the need for membership drives and made special mention of the fact that the Society was the only one to contribute the large amount of 35 percent to research. A fine ovation was extended to Mr. Hunter.

W. B. Martin, Jr., technical papers chairman, introduced G. C. Kerr, Construction Department, Johns Manville Sales Corp., New Orleans, La., who was the evening's speaker. Mr. Kerr spoke on *Noise Control* and acquainted those present with the latest sound-level meter. Thanks were given to Mr. Kerr for his informative discussion.

An entertaining evening was enjoyed by all and the meeting was adjourned. Attendance 63.

• *EMPIRE STATE CAPITAL:* The November meeting was held at the Aurania Club and was presided over by Pres. N. W. Burrill. L. V. Appleby presented the minutes of the previous meeting which were read and approved.

President Burrill turned the program over to R. B. Taylor who introduced the guest speaker of the evening, Society President Reg. F. Taylor. Mr. Taylor, consulting engineer of Houston, Tex., spoke about the Society, relating several interesting facts. In his talk on *Some Unusual Situations Encountered in Air Conditioning Design,* air conditioning problems were discussed and Mr. Taylor stated that as design progresses in the homes of today the owners desire a lower inside temperature. After a very enjoyable visit with President Taylor, the meeting was adjourned. Attendance 30. Attendance ratio 0.42.

• *EMPIRE STATE CAPITAL:* The regular October meeting was called to order by Pres. N. W. Burrill at the Shadow Box Restaurant. The minutes of the previous meeting were read and approved and the meeting was turned over to G. G. Davis.

Mr. Davis introduced the speaker, G. F. Landgraf, vice-president in charge of engineering of Trion Inc., McKees Rocks, Pa. The operation of electrostatic filters was discussed and a demonstration was used showing cigar smoke being removed by the filters. Many questions were asked and Mr. Landgraf received hearty thanks for his most interesting presentation. Attendance 40.

• *ILLINOIS:* The November meeting of the Illinois Chapter was called to order in the Merchandise Mart by Pres. H. G. Chapin.

M. E. Fine, of the meetings committee, introduced Prof. M. K. Fahnestock, research professor of mechanical engineering and chairman of the Advisory Committee for Physical Environment Unit, University of Illinois, Urbana, Ill. Professor Fahnestock gave detailed information on the special facilities just installed at the University for the study of environmental factors and their effects on both normal people as well as studies including the ill. In general the facilities make possible temperature variations from 45 to 120 F dry-bulb and relative humidities may be varied independently from 20 to 80 percent at any given dry-bulb.

Dr. F. K. Hick, professor of medicine, Department of Medicine, University of Illinois, Chicago, Ill., gave a very interesting talk on the results of environmental physiology studies, at the conclusion of the first talk. Dr. Hick presented a series of charts which were highly technical but at the same time interesting and informative. The question and answer period that followed became so interesting that President Chapin broke a long standing custom and did not adjourn the meeting at the usual hour. Attendance 106.

• *INDIANA:* The September meeting of the Indiana Chapter was presided over by Pres. R. C. Blackman. A moment of silence was observed for C. H. Carlson, a member of the Chapter, who had recently passed away.

W. F. Currise, program chairman, introduced I. W. Cotton, Society Council member and president of the I. W. Cotton Co., Indianapolis, Ind., who spoke on the problems of the Society. Mr. Cotton's presentation gave the members a clearer and more intimate view of the difficulties which the Society encounters. Many questions followed his interesting talk and a hearty round of applause from the members and guests was given to Mr. Cotton.

J. T. Hardin was presented with a past president's pin after which the meeting was adjourned. Attendance 34.

• *INDIANA:* The Indiana Chapter members were the guests of the Air Conditioning Council of Indianapolis at their annual *Bill Miller* Meeting.

Prof. W. T. (Bill) Miller, heating and ventilating, of Purdue University, West Lafayette, Ind., was the speaker and presented an informative and enjoyable discussion entitled *New Fields for the Heating and Ventilating Engineer.* Attendance 27.

• *INLAND EMPIRE:* The October meeting was highlighted with an outstanding talk on *Mechanical Construction at the Hanford Works of the AEC* by W. W. McIntosh of the Atomic Energy Commission, Richland, Wash. He outlined some of the problems attendant upon an installation of this nature and described the shielding and handling of radioactive materials. Water purification, and the disposal of radioactive wastes were covered. A most interesting discussion period followed.

For security reasons all questions could not be answered, but all things considered this was one of the most interesting and informative programs the Chapter has had in many months. Committee reports were presented by the following: L. E. Marque — Membership; and A. B. Hess — Publicity. A past president's pin was presented to retiring president T. P. Nau by Pres. G. M. Dieter. President Dieter presided at the meeting. Attendance 34.

• *KANSAS:* The November meeting was called to order by Pres. R. L. Pennington at the Broadview Hotel. The minutes of the preceding meeting were read and approved and a report on the Chapter's financial condition was presented by T. L. Roberts, treasurer.

Charles Yoe, program chairman, introduced H. T. Kucera, president of the Automatic Devices Co., Inc., Western Springs, Ill., who was the speaker for the evening. Mr. Kucera's subject was *Controlling the Heating of Buildings from Outdoors,* and sketches of typical installations of regulators on present-day heating systems supplemented his speech. The message of modern control of building temperatures from outdoors proved to be a most interesting and enjoyable one. Attendance 28. Attendance ratio 0.34.

•*KANSAS CITY:* The November meeting was called to order at the Wishbone Restaurant by Pres. G. H. Stoffer. The minutes of the previous meeting were read and approved and reports were presented by R. M. Spencer on the treasury, and by L. A. Heaven, who presented a favorable report on the success of the Fall party.

F. K. Ladewig introduced the speaker, O. S. Lieberg, president of the American Caliqua Co. of New York, N. Y. His talk was entitled *High Temperature Water Systems* and this interesting talk was illustrated by slides. A lively discussion session followed. Attendance 106. Attendance ratio 0.55.

• *MANITOBA:* The November meeting of the Manitoba Chapter was called to order in the Fort Garry Hotel. J. A. Bell read the minutes of the previous meeting which were approved as read.

John E. Haines
Minneapolis, Minn.

The question of appointing a delegate to the Annual Meeting brought nomination of J. A. Bell and of H. F. Randall as alternate.

The speaker of the evening was J. E. Haines, 2nd vice president of the Society and vice president, Commercial Division, Minneapolis-Honeywell Regulator Co., Minneapolis, Minn. Mr. Haines' talk was entitled *The Next Ten Years, Its Effects on the Industry and the Society,* and was one of interest to all. Attendance 27.

• *MASSACHUSETTS:* Pres. A. L. Hare presided at the October meeting at which program chairman G. W. Sprague introduced the guest speaker, J. A. Marshall, director of the School Assistance Commission for the state. Mr. Marshall discussed the aims and objectives of the commission and pointed out that the commission has allocated and passed on 200 million dollars worth of school construction in the past seven years.

At this meeting, committee chairmen were appointed and a joint meeting with *ASRE* for December 2 was discussed and voted upon. A committee headed by J. M. Means was appointed to investigate with other engineering societies the problem of employment placement opportunities for manufacturers representatives. Attendance 69. Attendance ratio 0.42.

• *MIAMI VALLEY:* Pres. Reg. F. Taylor presented his talk *Some Unusual Situations Encountered in Air Conditioning Design* at the October meeting. He pointed out that Houston now has over 200,000 tons of installed capacity or about 1/3 ton per person. He described the installation at the University of Houston and design criteria for the Houston area. He discussed hospital operating room air conditioning and showed slides of the gas engine operated air-to-air heat pump in his own home.

Committee reports were given by F. H. Doench, Jr., on membership; R. C. Allen reported on special events at the Annual Fall Outing; and C. T. Doudican spoke on the progress for drafting a Wet Heating Code. R. W. Kimmel, program chairman, outlined the program for the coming year. Pres. J. M. Schweiger presided. Attendance 26. Attendance ratio 0.39.

• *MICHIGAN: The Heat Pump,* a talk by H. E. Voegeli, American Brass Co., was the feature of the November meeting which was called to order at the Engineering Society of Detroit by Pres. R. H. Oberschulte.

In his talk, Mr. Voegeli gave a brief history and possible future development of the heat pump. He pointed out its high initial cost and its advantages in applications requiring both heating and cooling. A discussion of performances of existing installations, including that in his own home, concluded Mr. Voegeli's talk which stimulated a lively question period.

The new chapter by-laws were presented and approved and a greeting was extended to the large group of University of Detroit student members present by President Oberschulte. J. R. Cairns, president of the Student Branch, responded and Glenn Williams reported on the activities of the University of Detroit group. Attendance 113. Attendance ratio 0.29.

• *MICHIGAN:* The October meeting of the Michigan Chapter was called to order by Pres. R. H. Oberschulte at the Engineering Society of Detroit.

E. F. Glanz, program chairman, presented I. B. Fieldhouse, supervisor of Heat Transfer Section, Armour Research Foundation, of Chicago, Illinois. *Ceiling Radiant Heating and Cooling Systems* was the title of his talk, in which many advantages of panel type heating and cooling systems were described. A lively question and answer session followed.

P. S. Hosman, representative of APELSCOR, reported on the activities of his committee and the work done by several Chapter members in the preparation of questions and correcting of papers for the State Board Examinations for Registration of Professional Engineers. Attendance 140. Attendance ratio 0.33.

• *MINNESOTA:* The November meeting was called to order by Pres. V. E. Pearson in the Hasty Tasty Restaurant. L. D. Freedland, membership chairman, introduced four new members and asked for the assistance of all Chapter members in bringing in new members.

At the termination of the business part of the meeting, a very interesting talk was presented by J. M. Townsend, Regional Air Conditioning Manager of the Servel Corp., Chicago, Ill. Mr. Townsend's subject was *Residential Air Conditioning*, and his discussion was well received. Attendance 112.

• *MONTREAL:* Pres. B. J. Horsburgh called the November meeting to order at the Windsor Station Restaurant and proceeded to read the minutes of the October meeting. President Horsburgh discussed the coming 60th Annual Meeting in Houston and also read an announcement concerning the Mexican Post-Meeting Trip.

C. Milton Wilson, general sales manager of the Anemostat Corp. of New York, N. Y., was the guest speaker of the evening and the subject of his talk was *The Fundamentals of High Velocity Air Distribution.* Mr. Wilson's talk was especially entertaining as it was illustrated by slides. After an interesting question and answer period the meeting was adjourned. Attendance 92.

• *MONTREAL:* The October meeting was called to order by Pres. B. J. Horsburgh at the Windsor Station Restaurant. It was announced that the attendance for this meeting had established a record. The minutes were read and approved after which H. G. Murray discussed the Semi-Annual Meeting held in Denver. He commented that the Chapter had shown an increase in membership with a net gain of 12 percent.

A panel discussion on the subject, *Practice of Shopping in the Heating and Ventilating Trade*, was presented by W. G. Hole, moderator; R. E. J. Layton; E. W. Twizell; J. P. Fitzsimons; and Arthur DeBreyne. The presentation by the panel was excellent and considerable discussion took place between the audience and panel. D. L. Lindsay gave a summary of the results of the panel discussion and thanked the panel on behalf of the Chapter. Attendance 98.

• *NEBRASKA:* The November meeting of the Nebraska Chapter was called to order by Pres. O. J. Smith at the Rome Hotel.

J. E. Haines, 2nd vice president of the Society, was introduced and presented a talk entitled, *The Next Ten Years.* Mr. Haines, who is also vice president, Commercial Division, Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., presented a most informative and instructive talk which was enjoyed by one and all. Attendance 36.

• *NEBRASKA:* The October meeting was called to order by Pres. O. J. Smith at the Rome Hotel.

The guest speaker for the evening was Major R. C. Brookins, project officer in the Directorate of Materiel S-A-C, Offut Air Force Base, Omaha, Neb. *Aerodynamic Heating and Cooling* was the subject of Major Brookins' speech and a film on the latest aircraft accompanied this informative and instructive discussion. A question and answer period followed. Attendance 31.

• *NEW YORK:* The November meeting of the New York Chapter was held in the Building Trades Club and was presided over by Pres. J. E. Schechter. Society Past President, W. L.Fleisher, presented a Life Membership Certificate to R. H. Carpenter. Mr. Fleisher referred to the great services which Mr. Carpenter had rendered to the Society and to the New York Chapter.

R. L. Stinard, program chairman, presented Society President Reg. F. Taylor, who gave a talk on *Some Unusual Situations Encountered In Air Conditioning Design.* Mr. Taylor, consulting engineer of Houston, Tex., referred to Houston as the *most air conditioned* city having more than 200,000 tons of installed refrigeration and 20,000 window units, with an equivalent of 1/3 ton refrigeration per resident. The heat pump system operated by a gas engine for year 'round air conditioning installed in Mr. Taylor's home was also described. He particularly noted that he had found it possible to air condition the entire house with this system for the same cost as that of conditioning one room by an electric window unit. Following a question period a rising vote of thanks was given to Mr. Taylor for his informative and valuable talk. Attendance 100. Attendance ratio 0.18.

• *NORTH JERSEY:* Pres. F. H. Faust called the November meeting to order and proceeded to read a communication from the Society Headquarters urging that as many members as possible attend the 60th Annual Meeting in Houston at the end of January.

The speaker of the evening, T. Norman Willcox, was then introduced by H. M. Patrick, program chairman, who explained Mr. Willcox's interesting background in engineering and air conditioning work leading to his present association with the General Electric Co.

Mr. Willcox's subject was *Residential Air Conditioning* in which he described the various designs of domestic air conditioning apparatus, including evaporators and condensers. He also used slides to further explain his talk. The factual analysis of the operating cost of each, using both water and air as a coolant, was also discussed; and the cost data were based upon electrical and water costs as were current in the town of Montclair, N. J. An important part in the question and answer period that followed, was played by C. M. toeLaer, also of the General Electric Co., who assisted Mr. Willcox in several phases of the discussion. A hearty round of applause was given to Mr. Willcox for his most enjoyable speech. Attendance 90.

• *NORTH TEXAS:* The North Texas Chapter held its November meeting at the Melrose Hotel and the meeting was called to order by Pres. P. N. Vinther. Previously published minutes were approved as printed and the nominating committee consisting of R. E. Allison, H. M. Cunningham, and H. J. Martyn, Jr. presented the nominations for officers for 1954.

President Vinther introduced L. N. Hunter, 1st vice president of the Society, who discussed ASHVE activities. Mr. Hunter, vice president, Research, The National Radiator Co., Johnstown, Pa., presented a very comprehensive talk on the *Rating of Heating Boilers*. The *IBR*, *AGA*, *SBI* and *HPACCNA* codes were each discussed in detail, and slides were used in the presentation. The Chapter's appreciation of Mr. Hunter's presentation was well expressed by a rising vote of thanks. Attendance 101. Attendance ratio 0.45.

• *NORTHEASTERN OKLAHOMA:* The October meeting was called to order by Pres. J. N. Watt at the Student Activities Building of the University of Tulsa. An auditing committee and a nominating committee were appointed as follows: auditing committee — R. F. Shoemaker, chairman, R. L. Sigler, E. B. Cover; and nominating committee — H. W. Meinholtz, chairman, F. M. Thomas, W. C. Roads.

L. N. Hunter, 1st vice president of the Society and vice president, Research, of The National Radiator Co., Johnstown, Pa., spoke on *The Rating of Heating Boilers.* This talk was well illustrated and documented and presented the areas of present misunderstanding on this subject. The authority with which this subject was delivered did much to assure the listeners that further progress will be made to clarifying these issues. Attendance 34. Attendance ratio 0.50.

• *NORTHERN OHIO:* Pres. J. M. Black called the November meeting to order in the Allerton Hotel and called upon the secretary and treasurer to present their reports. New members were proposed by membership chairman E. F. Morse. Sherwood Nassau was appointed by the Board of Governors to the post of secretary, made vacant by the resignation of M. L. Erickson.

Program chairman H. R. Canoyer introduced the guest speaker, P. L. Geiringer, chief engineer, American Hydrotherm Corp., New York, N. Y., who spoke on *High Temperature Water Heat Distribution Systems.* He defined such systems as those carrying water at 200-450 F and presented slides showing typical installations. His talk evoked an interesting discussion. Attendance 75.

• *ONTARIO:* Pres. N. W. Kingsland called the November meeting to order at the Royal York Hotel.

Reg. F. Taylor, Society president, presented Life Membership Certificates to H. D. Henion and H. S. Moore. Mr. Taylor, consulting engineer of Houston, Tex., was the speaker of the evening and his subject for discussion was *Some Unusual Situations Encountered in Air Conditioning Design.* A hearty round of applause followed this enlightening talk.

K. E. Gould spoke about the coming 60th Annual Meeting in Houston and discussed *On to Houston Activities.* Attendance 108.

• *OTTAWA VALLEY:* The November meeting was held at the Prescott Hotel and was called to order by Pres. G. L. Ostiguy. The minutes of the previous meeting were read and approved after which J. W. Green was called upon to introduce the speaker, W. G. Colborne. Mr. Colborne, who is prominent in warm air heating research, had presented a paper on friction loss in 4-in. round pipe and fittings at the Society's 59th Annual Meeting in January 1953. Mr. Colborne, research assistant, Mechanical Engineering Department, Queens University, Kingston, Ont., pointed out that Queens University had set up a research organization to do research for small industries which could be done cheaper and better than these industries could do by themselves. Unfortunately, funds are limited for special equipment and instrumentation, and projects are now financed either by a company with a definite problem, or else in the case of a problem from individuals with no financial backing. The problems are now being handled by students studying for a Masters Degree, helped sometimes by fellowships. A lively and spirited question and answer period then ensued and the speaker was thanked for his interesting talk giving an insight into research being carried out in the warm air heating field. Attendance 35.

• *OTTAWA VALLEY:* The October meeting was called to order by Pres. G. L. Ostiguy at the Prescott Hotel and a welcome was extended to all new members and guests.

J. A. Neilson of Foster-Wheeler Ltd. was introduced as the guest speaker and the subject for discussion was entitled *The Standardization of the Water Tube Boiler in Canada.* Mr. Neilson outlined the main reasons for standardization and stated that with Canada growing as it is, with exports being of prime importance, and with competition becoming keener, cost reductions must be made. Standardization was one way of accomplishing this and it could be done by reducing labor and material costs. With mass production of standardized units, engineering costs could be greatly reduced as compared with tailor made custom built units. Slides were shown to further illustrate Mr. Neilson's most enjoyable and interesting address. Attendance 34.

• *PACIFIC NORTHWEST:* The October meeting was presided over by Pres. H. T. Orebaugh at the Mirror Room of the Steward Hotel. President Orebaugh and L. F. Christofferson, secretary, presented past presidents' pins to the following: H. D. Sparks, 1949-50; C. A. Pangborn, 1950-51; R. M. Stern, 1951-52; and W. B. Pride, 1952-53. Secretary Christofferson proceeded to read a letter of congratulations to A. E. W. Dodds in acknowledgment of his advancement to Superintendent of Buildings of the City of Seattle.

T. C. Caskey, program chairman, introduced Samuel Brown, of the Weyerhaeuser Timber Co., whose topic for discussion was *Forest Products, A Northwest Industry.* A color movie showing various phases of the logging industry was shown, as an accompaniment to his talk. The program was highly entertaining and a spirited discussion ensued. Attendance 48. Attendance ratio 0.44.

• *PHILADELPHIA:* The November meeting of the Philadelphia Chapter was called to order by Pres. C. F. Dietz at the Engineers Club.

Life Membership Certificates were presented to E. N. Black by H. B. Hedges and to E. K. Webster by G. W. A. Kappel.

The meeting was turned over to A. M. Robertson who introduced M. F. Blankin, Society and Chapter past president. Mr. Blankin introduced all of the former presidents of the Chapter, a very high percentage of the Chapter's past presidents being present. Reg. F. Taylor, Society President, was then introduced and he gave a brief resume of the work of the Society.

R. D. Tutt, chief engineer, Tuttle and Bailey, New Haven, Conn., presented a very interesting talk on *Modern Trends of Air Distribution.* Mr. Tutt received a vote of thanks for his enjoyable discussion after which the meeting was adjourned. Attendance 104. Attendance ratio 0.30.

•*PITTSBURGH:* F. B. Neyhart, sales engineer, Carrier Corp., presented an excellent talk at the November meeting. *Absorption Machines* was the title of Mr. Neyhart's talk and in it he described a lithium-bromide water absorption system using a generator and condenser in a high pressure shell and the evaporator and absorber in a low pressure shell. His talk was followed by a lively question and answer period. Vice Pres. E. C. Hach presided at the meeting at which reports of the entertainment and roster committees were presented. Attendance 57.

• *SOUTH TEXAS:* The October meeting of the South Texas Chapter was called to order by Pres. E. G. Floeter, Jr. at the Alabama Catering Service. J. B. Buckley, membership chairman, introduced visitors and F. M. Neil, secretary, read the minutes of the September meeting.

B. P. Fisher, publicity chairman for the 1954 60th Annual Meeting, described his work with the *Houston Post* and introduced Mr. Longhorn of the *Houston Post,* who furnished some details of a special edition to be offered. D. M. Mills discussed some further details for the Society's Annual Meeting and W. L. Lashley, Jr. reported on the forthcoming Christmas party.

Dr. W. W. Kemmerer, executive director of Houston World's Fair, Inc., presented a very interesting talk, after which the meeting was adjourned. Attendance 77. Attendance ratio 0.38.

• *VIRGINIA:* The November meeting was called to order by Pres. E. D. Duval at the Henry Walke Co. The minutes of the previous meeting were read and approved and the nominating committee gave a preliminary report on the slate of officers for 1954.

L. W. Brown, Jr., heating sales, Noland Co., Inc., Norfolk, Va., spoke to the group on burning heavy oils. Mr. Brown's talk included the various ways of preheating the oil, pumping the oil and burning the oil. The discussion of combustion chambers was also a part of Mr. Brown's informative talk, which was greatly enjoyed by all. Attendance 14. Attendance ratio 0.31.

• *WISCONSIN:* Pres. N. E. Hill called the meeting to order at the Elks Club and a motion was made and passed that the reading of the minutes be dispensed with.

L. C. Plaehn introduced the guest speaker of the evening, Fred C. Young, president and general manager of The Young Radiator Co., Racine. Mr. Young began his talk by referring to the St. Lawrence Seaway. Mr. Young pointed out the value of such a project to the Wisconsin industries. He then continued his talk, *Where Are We Going in Our Industry*. He pointed out that engineers will accept any challenge and that the people nowadays have greater comforts than their grandfathers had and expect greater comforts in any building. The heat pump was discussed and it was pointed out that pioneer companies in this field are suffering financial difficulties and that it is still an experiment. The meeting was adjourned with a rising vote of thanks to the speaker. Attendance 87. Attendance ratio 0.26.

STUDENT BRANCH

- *OKLAHOMA A. & M. COLLEGE:* The October meeting of the Oklahoma A. & M. Student Branch was called to order by Pres. R. P. Schmidt. The minutes of the previous meeting were read and approved, followed by the installation of the new officers for the 1953-54 season: R. P. Schmidt, president; C. E. Durrett, vice president; R. M. Jauch, secretary; G. D. Crocker, treasurer; and Prof. R. R. Irwin, faculty advisor.

William Orr, representative of the Hirsch Swan Corp. of Oklahoma City, Okla., was the guest speaker and gave a very interesting talk on the selection of a package or central unit for the home. Mr. Orr presented his viewpoints on questions submitted by the students and his discussion was well received. Attendance 10. Attendance ratio 0.55.

Candidates for Membership

The Society's By-Laws require that all applications for membership or advancement are to be sent to the Executive Secretary and the names of applicants and their references shall be printed in the next issue of the Journal of the Society, or mailed to all members. When the replies are received from references the Candidate's application shall be submitted to and acted upon by the Admission and Advancement Committee as soon as possible.

When the Admission and Advancement Committee has acted favorably upon a Candidate's application and assigned his grade, the Council shall confirm the election of the proposed Candidate for membership. During the past month there have been 126 applications for membership, including 4 reinstatements and 12 students; in addition 15 advancements have been received. The names of these men and their sponsors are published in the following list.

Members are requested to scrutinize the list with care. The Admission and Advancement Committee, and in turn, the Council, urge members to assume their share of responsibility of receiving these candidates into membership by advising the Executive Secretary promptly of any whose eligibility for membership is in any way questioned.

All correspondence in regard to such matters is strictly confidential, and is solely for the good of the Society, which it is the duty of every member to promote.

Unless objection is made by some member by January 29, 1954, these candidates will be voted upon by the Council. Those elected to membership will be notified by the Executive Secretary immediately after election.

Note: †Reinstatement. *Non-member. △Advancement.

Arizona

†Gilkerson, J. T., Design Engr., Clifford C. Sawyer, Cons. Engr., Phoenix. References: A. B. Algren, J. V. Borry, V. J. Carns, C. C. Sawyer.

†McPherson, E. R., Chief Mech. Engr., Place & Place, Archts. and Engrs., Tucson. References: W. A. Biddle, V. J. Carns, E. P. Hennesy, J. B. Hoaglund.

Arkansas

Daniel, M. D., Field Supt., E. W. Daniel, Plbg. & Htg. Co., Inc., North Little Rock. References: G. M. Cook, S. R. Hill, Maury Hughes, Jr., J. C. Lewis.

Daunis, G. S., Pres., George S. Daunis Co., Inc., Little Rock. References: Morris Benkovitz, R. E. Blaylock, Maury Hughes, Jr., J. C. Lewis.

Rozzell, G. M. Jr., Supt., E. W. Daniel Plbg. & Htg. Co., Inc., North Little Rock. References: R. E. Blaylock, Maury Hughes, Jr., J. C. Lewis, E. N. Pettit, Jr.

California

△Cockins, W. W., Partner, Scott Co., San Francisco. References: J. J. Nicholson, N. H. Peterson, G. M. Simonson, G. J. Yamas.

Crusey, H. M., Engr., General Electric Co., Los Angeles. References: W. L. Holladay, T. H. Parry, W. D. Paulson, Jr., C. W. Pollock.

Dwyer, L. E. Chief Mech. Engr., Clyde E. Bentley, Cons. Engr., San Francisco. References: K. F. Baldwin, Jr., C. E. Bentley, Eric Roberts, J. B. Smith.

Harnack, J. L., Engr., Powers Regulator Co., Los Angeles. References: David Ladd, W. P. Powers*, K. D. Simon, J. M. Winters.

Lang, A. B., Vice-Pres., Western Air & Refrig. Inc., Los Angeles. References: L. B. Davenport, J. S. Earhart, R. S. Farr, W. C. Stewart.

MacLean, W. W., Mech. Engr., Aladdin Heating Corp., Oakland. References: E. A. Fernsten, J. D. Mitchell, H. G. Smith, S. W. Terry.

Tennity, W. P., Partner, Tennity & Serfass, Los Angeles. References: L. B. Davenport, E. C. Evans, J. F. Park, K. D. Simon.

Colorado

Howes, D. E., Junior Partner, G. Robert Parker Co., Denver. References: N. H. Brickham, J. J. Johnson, H. W. Marshall, K. H. Smith.

Parker, G. R., Owner, G. Robert Parker Co., Denver. References: N. H. Brickham J. J. Johnson, H. W. Marshall, K. H. Smith.

District of Columbia

Ferguson, E. B., Engrg. Draftsman, Leon Chatelain, Jr., Archt., Washington. References: S. R. Allen, W. C. Jones, J. F. Lawrence, J. J. Nolan, Jr.

Robbins, S. H. Jr., Engrg., Johnson Service Co., Washington. References: S. R. Allen, W. C. Jones, J. J. Nolan, Jr., G. R. Walz.

JOURNAL SECTION

Georgia

Ostrander, W. S., Engr., Carrier Corp., Atlanta. References: E. A. Anderson, T. A. Barrow, Jr., J. G. Croley, J. S. Edgar.

Illinois

Day, D. W., Vice-Pres., Burgess-Manning Co., Chicago, References: Jackson Burgess*, J. B. Hewett, R. L. Leadbetter*, W. L. Manning*.

De Coudres, D. A., Engr., Bornquist Inc., Chicago. References: G. W. Bornquist, Frank Gall, H. A. Lockhart, R. O. Nelson.

Demance, R. F., Chief Engr., Beling Engineering Consultants, Moline. References: E. H. Beling, J. M. Harman, H. T. Kucera, W. B. Schuler.

Erwin, G. L., Jr., Vice-Pres., Heating Div., Crane Co., Chicago. References: J. W. James, E. N. McDonnell, M. W. McRae, R. E. Moore.

Harris, Jack, Repr., Burnham Corp., Chicago. References: C. C. Hornada, W. H. Kramer, F. W. Luft, Jr., W. G. Pennington.

Kadow, W. C., Liaison Engr., Burgess-Manning Co., Chicago. References: D. W. Day, J. W. James, E. J. Kurek, F. J. Linsenmeyer.

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Kritzer, H. E., Jr., Secy., Kritzer Radiant Coils, Inc., Chicago. References: H. A. Lockhart, M. W. McRae, W. B. Schuler, L. J. Smith.

△Lodge, R. H., Engr., Murphy & Miller, Inc., Chicago. References: H. G. Chapin, G. G. Freyder, B. S. Hattis, R. E. Hattis.

△Schwager, E. L., Partner-Owner, Tri-City Sales & Service Co., Granite City. References: C. H. Burnap, G. W. F. Myers, G. B. Rodenheiser, J. S. Rosebrough.

Stoyke, L. T., Section Engr., Sundstrand Mach. Tool Co., Rockford. References: J. Cardillo*, J. P. Magos*, M. W. McRae, C. E. Towner.

Westerberg, M. H., Vice-Pres., Northern Plumbing and Heating Co., Chicago. References: J. W. James, E. N. McDonnell, R. E. Moore, J. W. Turner*.

Whitman, K. E., Pres., Air-Cooling Engineering Co., Evanston. References: C. M. Burnam, Jr., W. J. Martin, L. S. Pawkett, C. E. Price.

Indiana

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Kansas

△Howley, R. M., Mech. Engr., State Architect's Office, Topeka. References: D. M. Allen, D. C. Hoss, Robert Orpin*, E. C. Sneegas.

Morris, L. W., Jr., J. R. DeRigne & Assocs., Kansas City. References: J. R. De Rigne, W. K. Dyer, F. J. Henthorn*, A. J. Sneller.

Thompson, W. F., Jr. Engr., J. R. De Rigne & Assocs., Kansas City. References: D. M. Allen, J. R. De Rigne, W. K. Dyer, A. J. Sneller.

Louisiana

Houghton, W. A., Mgr., Gulf-York Inc., New Orleans. References: C. A. Favrot, I. M. Richardson, O. F. Schully, E. J. Shepherd.

Maine

Hadlock, W. K., Mfrs. Repr., South Freeport. References: G. E. Fickett, Roy Richards*, W. H. Shipp, G. W. Sprague.

Maryland

Moritz, Ernest, Sr. Mech. Design Engr., H. Walton Redmile & Associates, Baltimore. References: G. M. Heslop, E. R. Kent, A.M.K. Kroft, R. K. Leilich.

Massachusetts

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Minnesota

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Missouri

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△Schulte, F. W., Jr., Engr., Dravo Corp. St. Louis. References: N. B. Barsha, B. L. Evans, G. B. Pattiz, H. C. Sharp.

Montana

△Prussing, R. L., Cons. Engr., Billings. References: J. H. McCabe, L. D. Niblack, G. M. Orr, E. O. Terrell*.

Nebraska

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New Jersey

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New York

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△Friedrich, H. E., Engr., Dustex Corp., Buffalo. References: W. R. Heath, H. S. Johnson, R. D. Madison, G. C. Norman.

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Ohio

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Wentling, W. H., Asst. Chief Engr., Lau Blower Co., Dayton. References: T. I. Byrd, E. A. Jones, J. D. Loveley, A. B. Newton.

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Oregon

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△Kelly, E. E., Associate, J. Donald Kroeker and Assocs., Portland. References: R. C. Chewning, J. D. Kroeker, T. H. McClung, J. P. McDermott.

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Kelble, F. R., Jr., Vice-Pres., Hoffman-Wolfe Co., Philadelphia. References: C. J. Forve, C. J. Lubking, E. A. Vanderslice, E. K. Wagner.

Lutz, H. W., Engr., Dravo Corp., Pittsburgh. References: J. H. Allison, E. C. Hach, F. C. McIntosh, B. B. Reilly.

Moll, C. J., Appl. Engr., Westinghouse Electric Corp, Sturtevant Div., Philadelphia. References: Warren Brewer, E. C. Lambert, Ludwig Mack, R. V. Smith.

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Steiner, George, Appl. Engr., Westinghouse Electric Corp., Sturtevant Div., Pittsburgh. References: E. C. Hach, H. W. Rainey, Jr., J. C. Reynolds, H. H. Thayer.

South Carolina

Merendino, Jasper, Section Mgr., Mech. Engrg., G. H. Preacher and Assocs., Cons. Engrs., Columbia. References: A. L. Blackstone, Jr., J. K. Centorbe, F. B. Herty, J. E. McMurray.

O'Neal, W. V., Sr. Engr., Marcus B. Durlach, Jr., Cons. Engr., Columbia. References: R. K. Demarest, Jr., M. R. Durlach, Jr., F. B. Herty, W. E. Kerr.

Suggs, Arthur M., Br. Mgr., The Trane Co., Columbia. References: A. L. Blackstone, Jr., M. R. Durlach, Jr., C. L. Ringquist, H. S. Willson*.

Texas

Abbott, H. M., Sales Engr., The Mott Co., Houston, References: R. O. Ayres. J. C. Lewis, H. G. McKee, Brock Mott.

Atkinson, A. L., Partner, Atcheson and Atkinson, Archts., Lubbock. References: M. J. Aderton, L. C. McKay, R. A. Mixon, T. F. Sartor.

Burnett, W. F., Jr., Sales Repr., Rheem Mfg. Co., Houston. References: E. A. Beason*, A. K. Cooke*, E. C. Smith*, L. W. Stitt*.

Cathey, G. S., Office Mgr., Snook & Aderton, Inc., Lubbock. References: M. J. Aderton, O. P. Harlan, Jr., R. A. Mixon, J. C. Wharton.

Donaghe, V. V., Partner, Branch Sheet Metal, Houston. References: R. E. Chrone, D. S. Cooper, R. J. Speich, H. C. Will.

Edelman, B. P., Partner, Alton Mfg. Co., Dallas. References: V. G. Cox, A. G. Pabst*, W. H. Smith, Jr., N. E. St. Clair.

Garry, V. B., Repr., Minneapolis-Honeywell Regulator Co., Lubbock. References: F. C. Brandt, F. J. Lindsey, B. J. Sledzik, William Root.

Kirby, L. H., Partner, Haynes & Kirby, Archts. & Engrs., Lubbock. References: M. J. Aderton, O. P. Harlan, Jr., H. L. Mayes, R. A. Mixon.

Lentz, R. V., Treasurer-Director, Southland Supply Co., Inc., Dallas. References: H. G. Gregerson, B. V. Henegar, G. A. Linskie, R. L. Patton.

Menefee, C. E., Engr., Eggelhof Engineers, Inc., Lubbock. References: O. P. Harlan, Jr., J. K. Jones, R. A. Mixon, J. C. Wharton.

Norwood, H. P., Mgr., Air Conditioning & Sheet Metal, Superior Mfg. Co., Amarillo. References: D. G. Halley, O. P. Harlan, Jr., R. A. Mixon, Edwin Snook.

△Schaffer, Eli, Partner, Atlas Air Conditioning Co., Houston. References: I. A. Naman, A. J. Natkin, M. B. Peiser, J. A. Walsh.

Smith, J. E. Htg. & Air Cond. Engr., Homer G. Maxey & Co., Lubbock. References: J. N. Brown*, E. J. Hatzenbuehler, John Hayes*, J. K. Jones.

△Stubbeman, A. W., Pres. & Gen. Mgr., Almar-York Co., Inc., Fort Worth. References: H. W. Broadwell, M. L. Brown, J. F. Moss, P. N. Vinther.

Virginia

Hurst, C. G. Jr., Mech. Engr., Hot Shoppes Inc., Roslyn. References: J. A. Bowers*, A. W. Campbell, M. D. Kiczales, G. R. Walz.

Washington

Bergman, C. G., Mgr., Central Service Sales Co., Seattle. References: Harry Beckstrom*, Hugh Raatz*, R. T. Rogers*, D. E. White.

Cain, W. E., Design Draftsman, Lyle E. Marque, Cons. Engr., Spokane. References: J. A. Doyle, L. E. Harris, L. E. Marque, R. D. Nevers.

Kruchek, Keith, Chief, Shops & Property Maint. Sect., Bonneville Power Administration, Vancouver. References: D. L. Benz, J. E. Finkbeiner, Edwin Hunt, R. T. Mudge.

Reeves, H. J., Owner, H. Jack Reeves, Cons. Engr., Spokane. References: G. M. Dieter, J. A. Doyle, L. E. Marque, G. C. Murray.

Wisconsin

△Youngman, E. C., Treas., Mead & Hunt Inc., Madison. References: C. H. Amundson, George Hall, C. J. Reuschlein, I. J. Rossiter.

JOURNAL SECTION

Canada

Aboud, S. J., Pres., Rock Utilities Ltd., Montreal, Que. References: Wilfrid Gallagher, Leo Garneau, J. G. LeFrancois, D. L. Lindsay.

Adkins, S. P., Fan Engr., British General Electric Co. (Canadian) Ltd., Montreal, Que. References: R. L. Douglas, Caradog Gibbon, M.P.F. Turneau, I. D. Walker.

Bilodeau, R. J., Sales Mgr., Commercial Div., Minneapolis-Honeywell Regulator Co., Montreal, Que. References: W. H. Evans, J. P. Fitzsimons, J. H. Fox, B. J. Horsburgh.

Bisset, D. J., Br. Mgr., E. H. Price, Ltd., Vancouver, B. C. References: D. M. Drake, D. B. Leaney, E. H. Price, R. C. Tufts.

Charles, E. R., Mech. Draftsman, Canadian National Railways, Montreal, Que. References: J. P. Fitzsimons, J. L. Knight, W. S. Murray, H. G. Winters.

Chown, T. L., Vice Pres., T. C. Chown Ltd., Montreal, Que. References: T. G. Anglin, D. L. Lindsay, G. N. Martin, W. W. Timmins.

Cirka, Borden, Plant Engr., Bulloch's Ltd., Winnipeg, Man. References: T. H. Bulloch*, M. N. Hall*, Dr. Kroll*, B. Wood*.

Durrell, K. A., Sales Repr., Perfex Controls Ltd., Montreal, Que. References: J. P. Fitzsimons, B. J. Horsburgh, A. J. Nickle, W. E. Williams.

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Kay, A. T., Marine Mech. Draftsman, The Victoria Machinery Depot Co. Ltd., Victoria, B. C. References: J. M. Bird, G. H. Birnie, W. G. McIntosh*, A. W. Sheret.

Marcinkowski, W. M., Wiggs, Walford, Frost & Lindsay, Montreal, Que. References: D. L. Lindsay, Jozef Pawlikowski*, Paul Thibault, G. L. Wiggs.

Marshall, H. S., Pres., Air-Care Ltd., Montreal, Que., References: T. G. Anglin, R. R. Duquette, J. P. Fitzsimons, B. J. Horsburgh.

†Moffat, O. G., Cons. Engr., Hamilton, Ont. References: W. C. Caldwell, J. H. Gregory, G. W. McCormick, Jr., H. R. Roth.

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Strand, S. H., Vice Pres., Murray Air Cond. Ltd., Toronto, Ont. References: J. H. Fox, C. W. Gordon, W.J.L. McLean, H. R. Roth.

Thorn, Richard, Cons. Engr., Montreal, Que. References: R. G. Barbour, Leo Garneau, F. A. Hamlet, W. G. Hole.

Tonelli, R. J., Long-Aboud Engineering Ltd., Montreal, Que. References: T. G. Anglin, B. J. Horsburgh, W. E. Jarvis, L.A.C. Walford.

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England

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Holland

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UNIVERSITY OF TORONTO, Toronto, Ont., Canada. Certified By: F. G. Ewens.

Andrews, W. V.
Banyai, Lajos
Devine, T. M.
Walker, W. D.

OBITUARIES

HARRY CHRISTENSON
Battle Creek, Mich.

Society members will be sorry to learn of the passing of Harry Christenson, ASHVE member since 1931.

Mr. Christenson was born on December 21, 1889, in Chicago, Ill. He joined Burke Brothers of Gary, Ind., in 1911. In 1917 Mr. Christenson left that company to serve in the Armed Forces during World War I. He was employed by the Hunter Prell Co., Battle Creek, Mich., in 1921, with whom he remained until the time of his death. Mr. Christenson was superintendent of heating projects and designing and drafting work and later became partner in the firm. His entire professional career was spent in the heating and ventilating field.

ALBERT E. BAUER
St. Paul, Minn.

The Society was notified of the passing of Albert E. Bauer on October 2, 1953, after several years of ill health.

Mr. Bauer, who was born on September 29, 1904 in St. Paul, Minn., attended the University of Minnesota, graduating in 1930 with a B.S. in Mechanical Engineering.

Mr. Bauer, a member of the Society since 1935, began his career with the Linde Air Products Co., Buffalo, N. Y., in their student training course. From 1931 to 1935 he was associated with the Brown Sheet Iron and Steel Co., St. Paul, Minn., doing general engineering work. He left that company to join the U.S. Air Conditioning Corp. of Minneapolis. In 1942 Mr. Bauer joined the Stainless & Steel Products Corp. of St. Paul as manager of the company's Special Products Division, later becoming chief engineer.

The Officers and Council of the Society extend their deep sympathy to Mr. Bauer's widow.

FRANK J. FEELY
Detroit, Mich.

It was with deep regret that the Society learned of the death of

OBITUARIES *(continued)*

Frank J. Feely on November 22, 1953.

Mr. Feely was born in Toledo, Ohio, on June 16, 1888, and attended public and preparatory schools in Toledo. From 1907-1909 he was associated with the National Supply Co. of Toledo, leaving that company to join the Ohio Plumbers Supply Co. as vice president in charge of the heating and plumbing department. In 1919 he joined The Taylor Supply Co. of Detroit, Mich., as manager of sales. In that capacity he was in charge of all heating and ventilating engineering and sales. Mr. Taylor was with the Taylor Supply Co. until the time of his passing, making a total of 34 years of service with the company.

Frank J. Feely

B. T. HAUER
Cincinnati, Ohio

The members of the Cincinnati Chapter and his many friends in the power and heating equipment business were deeply saddened to learn of the death on October 11, of B. T. Hauer, owner, Hauer Power Equipment Co. He had been an associate member of the Society since 1946. He was active in chapter affairs and his willingness to be of service and warm personality endeared him to everyone.

Born on March 12, 1891 in Springfield, Ohio, Mr. Hauer attended the University of Alabama and graduated from Wittenberg College in 1913 with an A. B. degree. He was a salesman for Lagonda Mfg. Co. of Springfield and later served in the same capacity for L. I. Snodgrass Co. of Cincinnati. He formed his own company in 1923 to represent manufacturers of power, industrial and heating equipment. During World War II Mr. Hauer served with the 149th Infantry regiment of the 38th Division as a Red Cross Field Director. He was also active in the American Legion.

Mr. Hauer is survived by his widow to whom the Officers and Council of the Society extend their deepest sympathies.

DANIEL W. HICKEY
St. Paul, Minn.

News has been received of the death of Daniel W. Hickey on November 15, 1953. Mr. Hickey was elected as an affiliate member in 1931 and had been inactive for several years.

Born on July 27, 1893 at St. Paul, Minn., he received his education in local schools graduating from St. Paul College of Law in 1917. Mr. Hickey was president of the D. W. Hickey and Co., Inc.

Mr. Hickey is survived by his widow to whom the Officers and Council of the Society extend their sympathy.

FRED G. LITTLE
Los Angeles, Calif.

It is with deep regret that the Society announces the passing of Fred G. Little, member of the Society since 1946.

Born on August 27, 1900, in Jamestown, N.Y., Mr. Little attended California Institute of Technology, graduating in 1924 with a B.S. in Electrical Engineering. From 1918 to 1920 he served in the United States Army with the Tank Corps as an instructor.

Mr. Little joined the Southern California Telephone Co. as an engineer in 1923. In 1944 he was employed by the Southern California Gas Co., as a service engineer. Mr. Little was serving in that capacity at the time of his death.

He was also a member of the *American Institute of Electrical Engineers* from 1924 to 1930.

ROBERT M. McDONALD
Detroit, Mich.

Word has been received of the untimely death of Robert M. McDonald at the age of 26 on November 14, 1953.

Mr. McDonald was born on June 4, 1927 in Windsor, Ont., Canada. He attended the Detroit Institute of Technology, graduating in 1950 with a B.S. in Mechanical Engineering.

Following graduation and up until the time of his passing Mr. McDonald was employed with Snyder & McLean, Engineers, as a junior design engineer in which capacity he did heat loss calculations, plumbing design and layout, ductwork and fan room equipment layout work.

Mr. McDonald joined the Society in 1952 and was a student member of the *Society of Automotive Engineers* in 1946.

He is survived by his parents, Mr. and Mrs. Robert McDonald and two sisters, all of Windsor, Ont., to whom the Officers and Council of the Society extend their sincere sympathy.

NICHOLS L. SPINELLI
Baltimore, Md.

The Society was greatly saddened to learn of the passing of Nichols L. Spinelli at the age of 41.

Mr. Spinelli was born on October 18, 1912, in Bolivar, Pa. He graduated from the University of Pittsburgh in 1938 with a B.S. in Mechanical Engineering.

In 1938 he joined Jos. E. Seagram & Sons, Baltimore, as a draftsman and mechanical engineer, which was followed by a one-year association with the Gardner Engineering Co. Mr. Spinelli served as a plant engineer with Frankfort Distilling Co., Inc., from 1941 to 1945 and with Records & Goldsborough, Inc. from 1945-1947. He joined The City Baking Co. in 1948 as superintendent of engineering and was serving in this capacity at the time of his death.

Mr. Spinelli joined the Society in 1949 and was an active member of the Baltimore Chapter, serving as its secretary in 1950 and as a member of the board of governors in 1951. He was a registered professional engineer in the State of Maryland.

MURRAY WALDMAN
Brooklyn, N.Y.

The Society was shocked to learn of the passing of Murray Waldman at the age of 25.

Mr. Waldman was born on March 23, 1928 in New York City, where he attended the College of the City of New York, graduating in 1951 with a B.S. in Mechanical Engineering.

Following graduation, Mr. Waldman was employed as a mechanical engineer with the U.S. Army Ordnance, Picatinny Arsenal, Dover, N. J. Later he served as a mechanical engineer with the Material Laboratory of the N.Y. Naval Shipyard in the Heating, Ventilating and Air Conditioning Section.

Mr. Waldman joined the Society as a student member in 1950 and upon graduation from college was granted junior membership in 1951.

LYLE G. PARROTT
Detroit, Mich.

The Society was greatly saddened to learn of the death of one of its Life Members, Lyle G. Parrott on November 13, 1953.

Born on March 9, 1885, in Mt. Clemens, Mich., Mr. Parrott attended the University of Michigan, graduating in 1911 with a B.S. in Civil Engineering.

Following graduation, Mr. Parrott was employed as construction superintendent with Bryant & Detwiler Co. of Detroit. In 1913 he joined the staff of Ammerman & McColl, a consulting engineering firm, where he supervised mechanical and electrical installations. Mr. Parrott became a member of the firm, McColl, Snyder & McLean, successors to Ammerman & McColl, in 1921. The firm became Snyder & McLean in 1936 and Mr. Parrott, a member of the firm until the time of his death, was in complete charge of installation of mechanical and electrical installations.

L. G. Parrott
Detroit, Mich.

Mr. Parrott joined the Society in 1922 and was a registered professional civil engineer in the State of Michigan.

JAMES WILSON
Montreal, Que., Canada

Word was recently received of the passing of Society member, James Wilson, service engineer, Darling Bros., Ltd., Montreal.

Mr. Wilson was born on March 1, 1887 in Motherwell, Scotland, where he attended high school, graduating in 1903. He attended Glasgow Technical School between 1903 and 1907 where he took a mechanical course. He joined the Russel Co., Ltd. in 1903 as an apprentice machinist and from 1908 to 1911 he served as a draftsman for that company. Between 1911 and 1927 Mr. Wilson served, respectively, as machinist and assistant foreman for Stewart & Lloyd, Ltd., as an engineer with the Royal Navy, and as machinist with the Canadian Pacific Railway. In 1928 Mr. Wilson joined Darling Bros., Ltd., where he remained until the time of his passing.

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• **ARKANSAS:** 1952. Hdqrs., Little Rock, Ark. Meets, Third Tuesday. PRESIDENT, Herman Cumnock, 401 W. Capitol Ave. SECRETARY, W. J. Franklin, 619 Rector Bldg.

• **ATLANTA:** 1937. Hdqrs., Atlanta, Ga. Meets, Second Monday. PRESIDENT, J. G. Croley, 400 Batavia St., East Point, Ga. SECRETARY, T. A. Barrow, 157 Simpson St., N.W.

• **BALTIMORE:** 1949. Hdqrs., Baltimore, Md. Meets, Third Wednesday. PRESIDENT, H. D. Glaser, Federal Land Bank Bldg., 2315 St. Paul St. (18). SECRETARY, G. J. Senner, 6010 Edmondson Ave. (28).

• **BRITISH COLUMBIA:** 1952. Hdqrs., Vancouver, B.C., Canada. Meets, Second Wednesday. PRESIDENT, C. W. Leek, 1155 West 49th Ave. SECRETARY, D. A. English, 6412 Adera St.

• **CENTRAL NEW YORK:** 1944. Hdqrs., Syracuse, N. Y. Meets, Fourth Wednesday. PRESIDENT, C. R. Acheson, 306 W. Genesee St. SECRETARY, H. K. Ormsby, 205 S. Townsend St. (2).

• **CENTRAL OHIO:** 1944. Hdqrs., Columbus, Ohio. Meets, Third Monday. PRESIDENT, N. T. Hess, 63 E. Goodale St. SECRETARY, R. A. Wilson, 20 S. Third St., (15).

• **CINCINNATI:** 1932. Hdqrs., Cincinnati, Ohio. Meets, First Tuesday. PRESIDENT, R. C. Beineke, 626 Broadway, (2). SECRETARY, A. H. Gerdsen, 224 E. Second St., (2).

• **CONNECTICUT:** 1940. Hdqrs., New Haven, Conn. Meets, Third Thursday. PRESIDENT, G. F. Nieske, 165 Maple St., Naugatuck. SECRETARY, E. J. Hoagland, 257 S. Whitney St., Hartford.

• **DELTA:** 1939. Hdqrs., New Orleans, La. Meets, Third Tuesday. PRESIDENT, H. L. Salaun, 317 Baronne St. SECRETARY, T. J. Jenny, 1000 S. Peters St., (9).

• **EMPIRE STATE CAPITAL:** 1951. Hdqrs., Albany, N. Y. Meets, Second Wednesday. PRESIDENT, N. W. Burrill, 33 Riverside Ave., Rensselaer. SECRETARY, L. V. Appleby, 373 State St.

• **GOLDEN GATE:** 1937. Hdqrs., San Francisco, Calif. Meets, First Thursday. PRESIDENT, J. E. Murray, 350 Mission St. (5). SECRETARY, D. E. McLeod, 105 San Pablo Ave. (27).

• **ILLINOIS:** 1906. Hdqrs., Chicago, Ill. Meets, Second Monday. PRESIDENT, H. G. Chapin, 185 N. Wabash Ave., (1). SECRETARY, H. G. Gragg, Rm. 1310, 228 N. LaSalle St. (1).

• **INDIANA:** 1943. Hdqrs., Indianapolis, Ind. Meets, Fourth Tuesday. PRESIDENT, R. C. Blackman, 5505 N. Illinois St., (8). SECRETARY, J. W. Jackson, 3514 N. Drexel, (18).

• **INLAND EMPIRE:** 1950. Hdqrs., Spokane, Wash. Meets, First Friday after First Tuesday. PRESIDENT, G. M. Dieter, 917 W. Mallon. SECRETARY, F. W. Jenkinson, N. 1904 Smith St., (15).

• **IOWA:** 1940. Hdqrs., Des Moines, Ia. Meets, Second Tuesday. PRESIDENT, J. F. Sandfort, Iowa State College, Ames. SECRETARY, G. J. Kraai, 907 Sixth Ave. (14).

• **KANSAS:** 1951. Hdqrs., Wichita, Kan. Meets, Tuesday after First Monday. PRESIDENT, R. L. Pennington, 520 So. Commerce (2). SECRETARY, O. B. Strahm, 601 So. Terrace Dr.

• **KANSAS CITY:** 1917. Hdqrs., Kansas City, Mo. Meets, First Monday. PRESIDENT, G. H. Stoffer, 200 Riss Building (6). SECRETARY, A. S. Hurt, Jr., 2119 Washington St., (8).

• **MANITOBA:** 1935. Hdqrs., Winnipeg, Man., Canada. Meets, Fourth Thursday. PRESIDENT, A. K. Piercy, 222 Osborne St. N. SECRETARY, D. B. Brace, 1550 Dublin Ave.

• **MASSACHUSETTS:** 1912. Hdqrs., Boston, Mass. Meets, Third Tuesday. PRESIDENT, A. L. Hare, 127 Federal St. (10). SECRETARY, W. G. Martin, Jr., 20 Winchester St. (16).

• **MEMPHIS:** 1944. Hdqrs., Memphis, Tenn. Meets, Third Monday. PRESIDENT, A. W. Shelby, 972 Union Ave. SECRETARY, A. T. Bevil, 1638 Union Ave. (4).

• **MIAMI VALLEY:** 1950. Hdqrs., Dayton, Ohio. Meets, First Wednesday. PRESIDENT, John Schweiger, 593 Acorn Drive, Dayton (9). SECRETARY, D. E. Tullis, 743 Kiser St. (4).

• **MICHIGAN:** 1916. Hdqrs., Detroit, Mich. Meets, First Monday after 10th of month. PRESIDENT, R. H. Oberschulte, 316 McKerchey Building, (1). SECRETARY, D. S. Falk, 4864 Woodward Ave. (1).

• **MINNESOTA:** 1918. Hdqrs., Minneapolis, Minn. Meets, First Monday. PRESIDENT, V. E. Pearson, 739 Marquette Ave. (2). SECRETARY, E. T. Erickson, 500 Baker Arcade.

• **MISSISSIPPI:** 1953. Hdqrs., Jackson, Miss. PRESIDENT, I. E. Rowe, 120 Georgia St. SECRETARY, M. E. Price, 205 Arbor Hill Dr.

• **MONTREAL:** 1936. Hdqrs., Montreal, Que., Canada. Meets, Third Monday. PRESIDENT, B. J. Horsburgh, 940 Ogilvy Ave. (15). SECRETARY, R. J. Ker, 1000 Beaver Hall Hill, P. O. Box 340.

• **NEBRASKA:** 1940. Hdqrs., Omaha, Neb. Meets, Second Tuesday. PRESIDENT, O. J. Smith, 233 Grain Exchange Bldg., (2). SECRETARY, C. A. Failor, 5736 N. 33rd St. (11).

• **NEW YORK:** 1911. Hdqrs., New York, N. Y. Meets, Third Monday. PRESIDENT, J. E. Schechter, 32-08 38th Ave., Long Island City (1). SECRETARY, Carl H. Flink, 62 Worth St. (13).

• **NORTH JERSEY:** 1952. Hdqrs., Newark, N. J. Meets, Second Tuesday. PRESIDENT, F. H. Faust, 5 Lawrence St., Bloomfield. SECRETARY, C. H. Smith, 2490 Vreeland Mills Rd., Linden.

• **NORTH TEXAS:** 1938. Hdqrs., Dallas, Tex. Meets, Third Monday. PRESIDENT, P. N. Vinther, 929 Mercantile Securities Bldg. SECRETARY, J. A. Ray, 4411 Belmont Ave. (4).

• **NORTHEASTERN OKLAHOMA:** 1948. Hdqrs., Tulsa, Okla. Meets, Second Tuesday. PRESIDENT, J. N. Watt, 528 E. Fifth. SECRETARY, J. C. Netherton, Jr., 3130 E. 44th St.

• **NORTHERN OHIO:** 1916. Hdqrs. Cleveland, Ohio. Meets, Second Monday. PRESIDENT, J. M. Black, 1296 Gordon Rd., Lyndhurst. SECRETARY, Sherwood Nassau, 6014 Euclid Ave.

• **NORTHERN PIEDMONT:** 1952. Hdqrs., Greensboro, N.C. Meets, Second or Third Friday. PRESIDENT, J. E. Hart, 1001 E. Bessemer Ave. SECRETARY, S. T. Oliver, 2307 Fairfield Ave.

• **OKLAHOMA:** 1935. Hdqrs., Oklahoma City, Okla. Meets, Second Monday. PRESIDENT, F. X. Loeffler, Jr., Box 529. SECRETARY, G. E. Ervin, 2800 N. Oklahoma St. (5).

• **ONTARIO:** 1922. Hdqrs., Toronto, Ont., Canada. Meets, First Monday. PRESIDENT, N. W. Kingsland, 31 Willcocks St. SECRETARY, H. R. Roth, 57 Bloor St., W.

• **OREGON:** 1939. Hdqrs., Portland, Ore. Meets, Thursday after First Tuesday. PRESIDENT, A. N. Hoss, 621 S.W. Alder (5). SECRETARY, J. E. Finkbeiner, 10260 S.W. Daphne Pl (1).

• **OTTAWA VALLEY:** 1952. Hdqrs., Ottawa, Ont., Canada. Meets, Third Tuesday. PRESIDENT, G. L. Ostiguy, 282 Westhill Ave. (3). SECRETARY, N. J. Howes, Box 264, R. R. 1.

• **PACIFIC NORTHWEST:** 1928. Hdqrs., Seattle, Wash. Meets, Second Tuesday. PRESIDENT, H. T. Orebaugh, 1330 Dearborn. SECRETARY, L. F. Christofferson, 7358-58th Ave. N.E., (5).

• **PHILADELPHIA:** 1916. Hdqrs., Philadelphia, Pa. Meets, Second Thursday. PRESIDENT, C. F. Dietz, 3449 W. Indiana Ave. (32). SECRETARY, P. H. Yeomans, Architects Building (3).

• **PITTSBURGH:** 1919. Hdqrs., Pittsburgh Pa. Meets, Third Monday. PRESIDENT, C. H. Schneider, 310 Washington Rd. SECRETARY, E. H. Riesmeyer, Jr., 231-33 Water St (22).

• **ROCKY MOUNTAIN:** 1944. Hdqrs., Denver, Colo. Meets, First Wednesday. PRESIDENT, H. L. Wray, 1101 Geneva St., Aurora. SECRETARY, J. F. Cipra, Jr., 2676 S. Madison St.

• **SACRAMENTO VALLEY:** 1952. Hdqrs., Sacramento, Calif. Meets, First Wednesday. PRESIDENT, E. C. McKinsey, 4220 Annette (21). SECRETARY, R. A. Sarro, 5412 Argo Way.

• **ST. LOUIS:** 1918. Hdqrs., St. Louis, Mo. Meets, Second Tuesday. PRESIDENT, H. C. Sharp, 4060 W. Pine Blvd. (8). SECRETARY, W. P. Norris, 1118 Fullerton Bldg.

• **SHREVEPORT:** 1948. Hdqrs., Shreveport, La. Meets, Third Thursday. PRESIDENT, M. A. Hudson, 753 Gladstone Blvd. SECRETARY, R. S. Segall, 603 Cotton St.

• **SOUTH TEXAS:** 1938. Hdqrs., Houston, Tex. Meets, Third Friday. PRESIDENT, E. G. Floeter, Jr., P.O. Box 1657 (1). SECRETARY, F. M. Neil, 3513 W. Dallas Ave. (19).

• **SOUTHERN CALIFORNIA:** 1930. Hdqrs., Los Angeles, Calif. Meets, First Tuesday. PRESIDENT, L. B. Davenport, 137 S. Anderson St. (33). SECRETARY, J. L. McCullough, 1978 S. Los Angeles St. (11).

• **SOUTHERN PIEDMONT:** 1952. Hdqrs., Charlotte, N.C. PRESIDENT, R. E. Mason 1726 Hutchinson Ave. (1). SECRETARY, S B. Blanton, Box 6096

• **SOUTHWEST TEXAS:** 1946. Hdqrs., San Antonio, Tex. Meets, Third Tuesday. PRESIDENT, L. H. Hornor, Jr., 816 Insurance Bldg. SECRETARY, Boone Crisp, P.O. Box 9065, (4).

• **UTAH:** 1944. Hdqrs., Salt Lake City, Utah. Meets, Third Thursday. PRESIDENT, M. L. Gollaher, 1163 Roosevelt Ave. (5). SECRETARY, G. L. Soderborg, Sr., 42 E. 8th St. S.

• **VIRGINIA:** 1946. Hdqrs., Norfolk, Va. Meets Third Wednesday. PRESIDENT, E. D. Duval, 1023 Hanover Ave. SECRETARY, T. B Carpenter, 412 Chester St.

• **WASHINGTON, D. C.** 1935. Hdqrs., Washington, D. C. Meets, Second Wednesday. PRESIDENT, J. G. Muirheid, Bureau of Ships, Navy Dept. (25). SECRETARY, W. C. Reamy, Jr., 17th & Pennsylvania Ave., N. W. (6).

• **WEST TEXAS:** 1953. Hdqrs., Lubbock, Tex. PRESIDENT, R. A. Mixon, 227 Whiteside Bldg. SECRETARY, R. B. Carow, 3721 31st St.

• **WESTERN MICHIGAN:** 1931. Hdqrs., Grand Rapids, Mich. Meets. Second Monday. PRESIDENT, J. T. Anderson Michigan State College, East Lansing. SECRETARY, N. A. Buckley, 514 Park Rd., Jackson.

• **WESTERN NEW YORK:** 1919. Hdqrs., Buffalo, N. Y. Meets, Second Monday PRESIDENT, C. W. Stone, 1219 Main St. (9). SECRETARY, C. W. Kaupp, 271 Delaware Ave.

• **WISCONSIN:** 1922. Hdqrs., Milwaukee, Wis Meets, Third Monday. PRESIDENT, N. E. Hill, 122 N. Hartwell Ave., Waukesha. SECRETARY, K. H. Forfar, 2711 N. 27th St. (10)

SPECIAL BRANCH

• **SWISS:** 1952. Hdqrs., Zurich, Switzerland PRESIDENT, Leo de Bruyn, Muhlebachstr, 172, Zurich. SECRETARY, Walter Hausler, Erbstrasse 2, Kusnacht, Zurich.

STUDENT BRANCHES

• **NORTH CAROLINA STATE COLLEGE:** 1948. Hdqrs., Raleigh, N. C. PRESIDENT, Norman Falbaum, Box 4668, State College Station. SECRETARY, J. L. Flowers, Apt. 33-E, Vetville.

• **OKLAHOMA A. & M. COLLEGE:** 1950. Hdqrs., Stillwater, Okla. Address mail to: Prof. R. R. Irwin, Dept. of M. E., Oklahoma A. & M. College.

• **OREGON STATE COLLEGE:** 1949. Hdqrs., Corvallis, Ore. Meets, First Wednesday after First Tuesday PRESIDENT R E Bulletset 252 Kings Rd. SECRETARY, I. P. Parkhurst, 1354 Harrison.

• **PURDUE UNIVERSITY:** 1948. Hdqrs., W. Lafayette, Ind. CHAIRMAN, N. J. Kirch 922 Highland Ave., Lafayette. SECRETARY, H F. Allen, Jr., 629 University St.

• **TEXAS A. & M. COLLEGE:** 1946. Hdqrs., College Station, Tex. Meets, Second and Fourth Tuesday. PRESIDENT, D. F. Carroll, Box 6264. SECRETARY, C. W. Farrar, Jr., Rt. 1, Box 339, Bryan.

• **UNIVERSITY OF DETROIT:** 1949. Hdqrs., Detroit, Mich. Meets, First Tuesday. PRESIDENT, J. R. Cairns, 4001 Florence, (21). SECRETARY, W. E. Zimmerman, 15359 Lauder (27).

• **UNIVERSITY OF KANSAS:** 1949. Hdqrs., Lawrence, Kans. Address mail to Dr. Warren E. Snyder, chairman, Dept. of Mechanical Engineering, University of Kansas.

• **UNIVERSITY OF TEXAS:** 1949. Hdqrs., Austin, Tex. Meets, First and Third Tuesday. PRESIDENT, H. M. Braymer, 1307-C Brackenridge Apts., (3). SECRETARY, A. D. Wilkinson, Jr., 1423-B Brackenridge Apts., (3).

• **UNIVERSITY OF TORONTO:** 1951. Hdqrs., Toronto, Ont. CHAIRMAN, D. S Harper, 737 Sammon Ave. SECRETARY, L. S Mitchell, 88 Lawrence Crescent.

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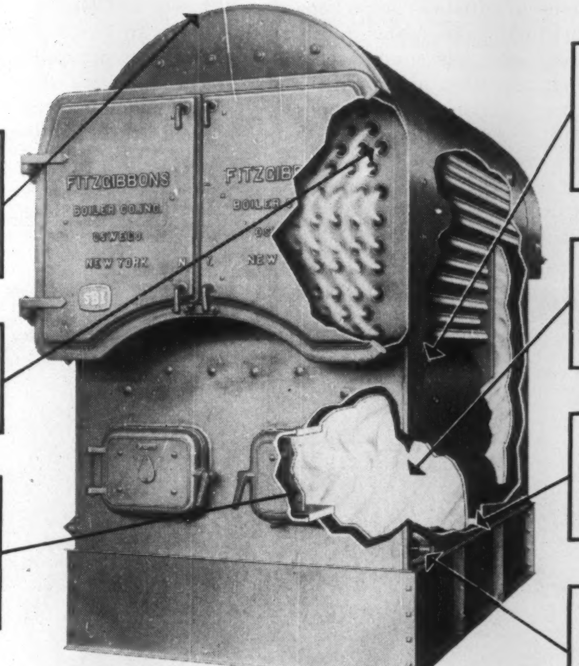
More Than Meets Your Boiler Specifications



Steel Construction — heavy "flange" quality steel plate is electrically welded to provide strength and durability. Workability of steel permits boiler design for quick, economical transfer of heat.

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Complete Combustion — firebox of adequate height and volume provides maximum efficient burning of fuel. Ideal for oil, gas, or coal (stoker or hand-fired).

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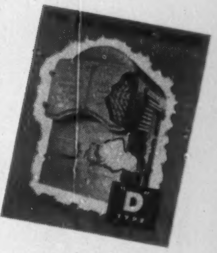

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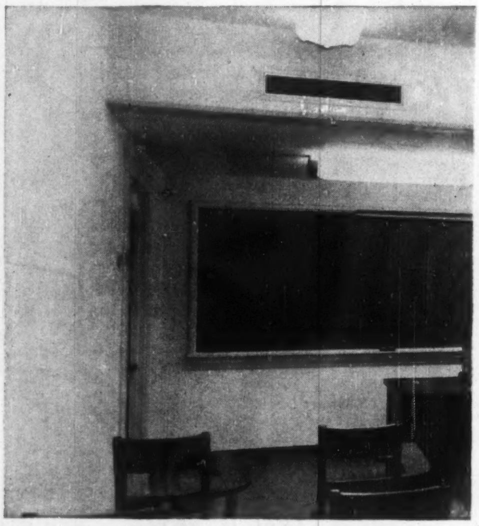
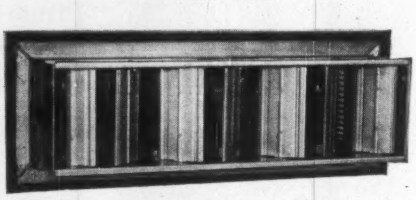
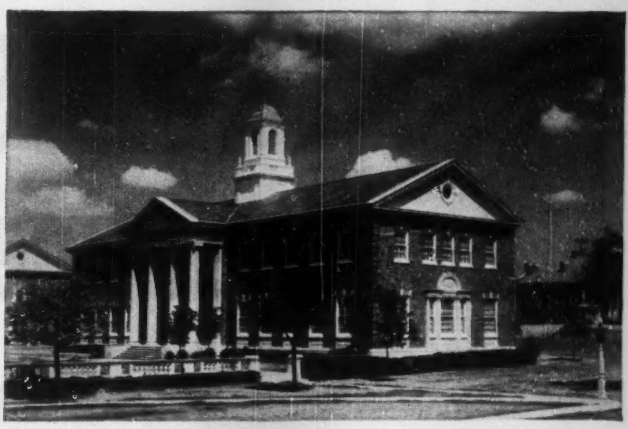
Aerial view of the impressive campus, scene of an enormous postwar building program. Under the leadership of Dr. Umphrey Lee, president, the University has grown rapidly in educational stature as well as in modern housing.



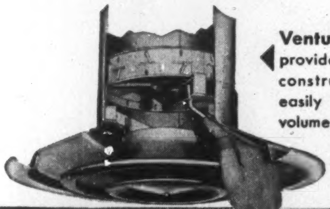


Double Deflection "MA" Sidewall Diffusers were specified for many applications. Features include integral volume control, easily removed cores, rapid diffusion, low noise level.

Fondren Science Building one of the most modern in the nation, located on North Campus. 224 Uni-Flo Sidewall Diffusers and Venturi-Flo Ceiling Diffusers distribute air evenly, quietly.



Bridewell Library, Perkins Quadrangle. In this building alone are 141 Uni-Flo Sidewall Diffusers and 63 Venturi-Flo Ceiling Diffusers, all equipped with Volocitrols in supply duct approaches.



Venturi-Flo Ceiling Diffusers provide efficient diffusion, rigid construction, quiet operation, easily adjustable deflection and volume control in units noted for attractive, modern design.

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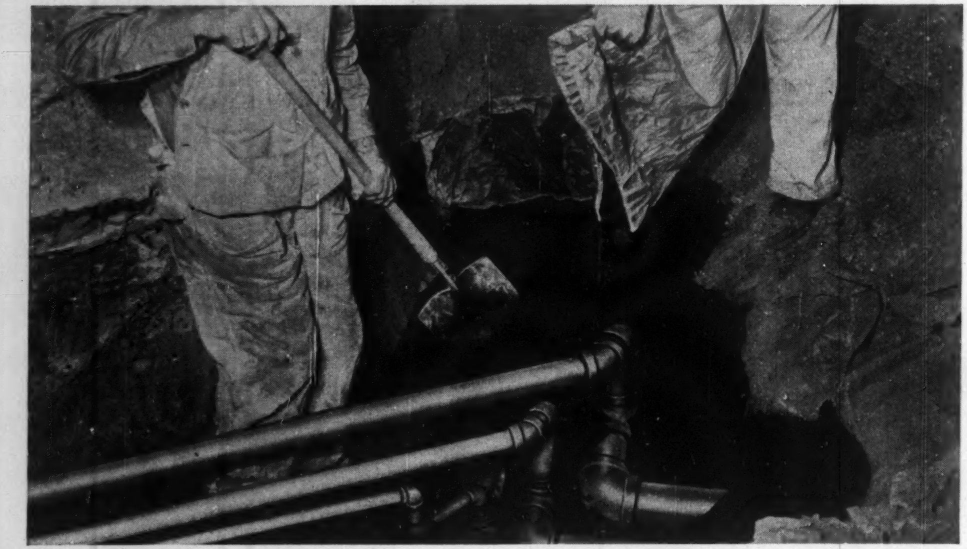

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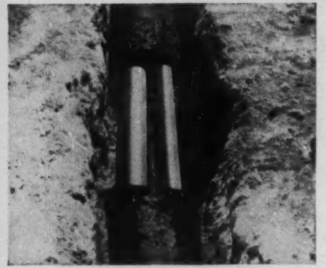

GILSULATE forms its own massive circular sheath after backfill and normal introduction of heat (up to 520° F.) through pipes.

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GILSULATE costs less installed per linear foot *than any other hot underground pipe installation*...it's easiest-to-use...and has been tested in scores of the country's largest and most important installations

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Colorado	Denver 2, Joy and Cox, Inc., 2124 Broadway
Georgia	Atlanta, American Gilsonite Co., H. L. Armentrout, 831 Briarcliff Road
Illinois	Chicago 6, Roy O. Nelson Co., 330 South Wells Street
Indiana	Indianapolis 2, Jackson Engineering Co., Inc., 1531 N. Pennsylvania St.
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Missouri	Kansas City 8, Anderson-Stolz Corp., 1727-33 Walnut Street St. Louis 1, Eagle Industrial Co., 119 North Seventh Street
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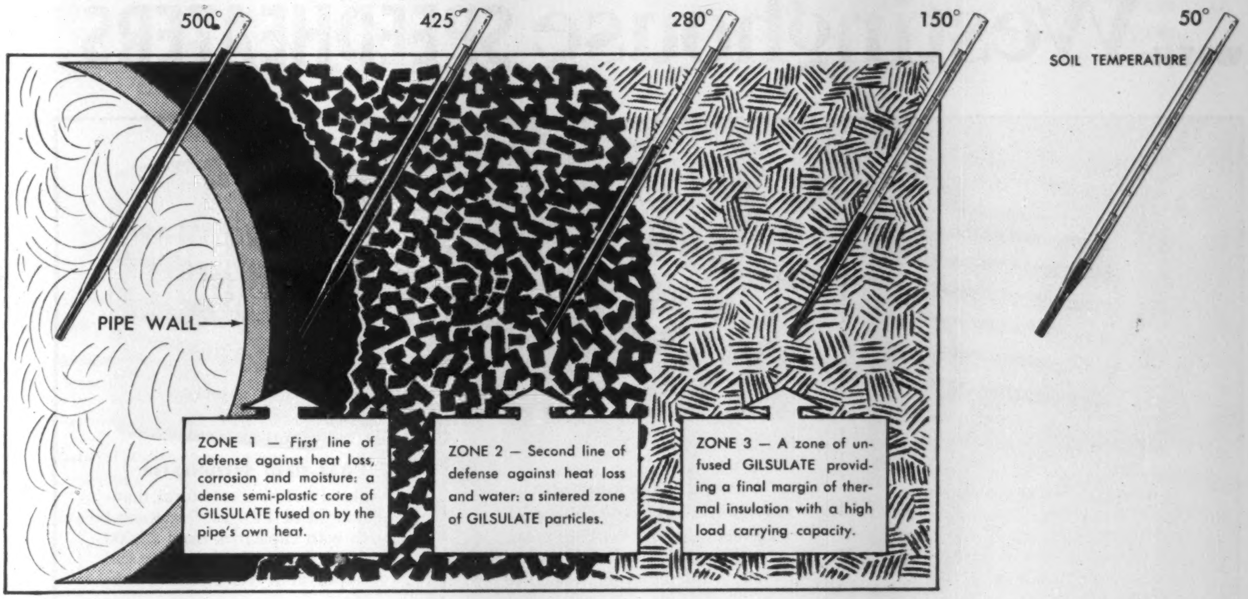
can revolutionize the insulation of buried pipe installations...



ZONE 1 — First line of defense against heat loss, corrosion and moisture: a dense semi-plastic core of GILSULATE fused on by the pipe's own heat.

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that fuses itself into lifetime protection for corrosion-proof, root-proof, acid/alkali-proof

A few additional GILSULATE advantages:

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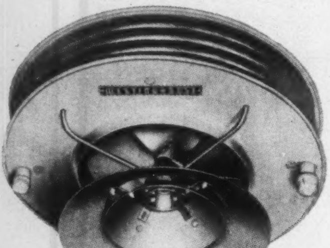

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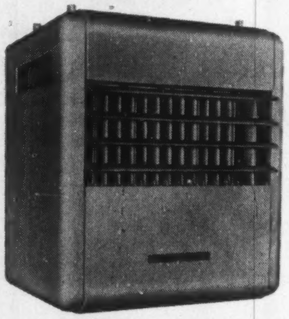

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6. **Quiet Operation**—efficient fan design gives top performance at low sound level.
7. **Dependable Westinghouse Motors**—Replacement motors available on exchange basis from Westinghouse stocking points across the country.

For full details on the Speedheater model best suited to your needs, call your nearest Westinghouse office for Catalogs 1521 (Steam and Hot Water) and 1525 (Gas-Fired), or write Westinghouse Electric Corp., Sturtevant Division, Boston 36, Mass.

WESTINGHOUSE SPEEDHEATERS

YOU CAN BE SURE...IF IT'S Westinghouse

J-80342

"Combines the Esthetic and the Practical..."

This description aptly fits both the ultra-modern housing project shown here and the U·S·S National Steel Pipe used in its construction.

In the recently completed Armstrong Court in Greenwich, Connecticut, National Pipe is used not only in the central forced hot water steam plant which heats the huge project but in decorative hand rails and porch railings to carry out the trim, clean cut, modern appearance of the structure.

For over 60 years, U·S·S National has been the standard pipe for conventional hot water and steam heating systems, fire control, and plumbing lines. And today it is the first choice, too, for modern radiant heating and snow melting installations. Long experience, the result of thousands of varied applications, has proved to pipe users that they can put their full confidence in the uniform, dependable, trouble-free performance of National Pipe.

Whenever you plan your installation, regardless of the type of service called for, plan on using U·S·S National Steel Pipe. Large or small, simple or complex, National can fill your every pipe need.

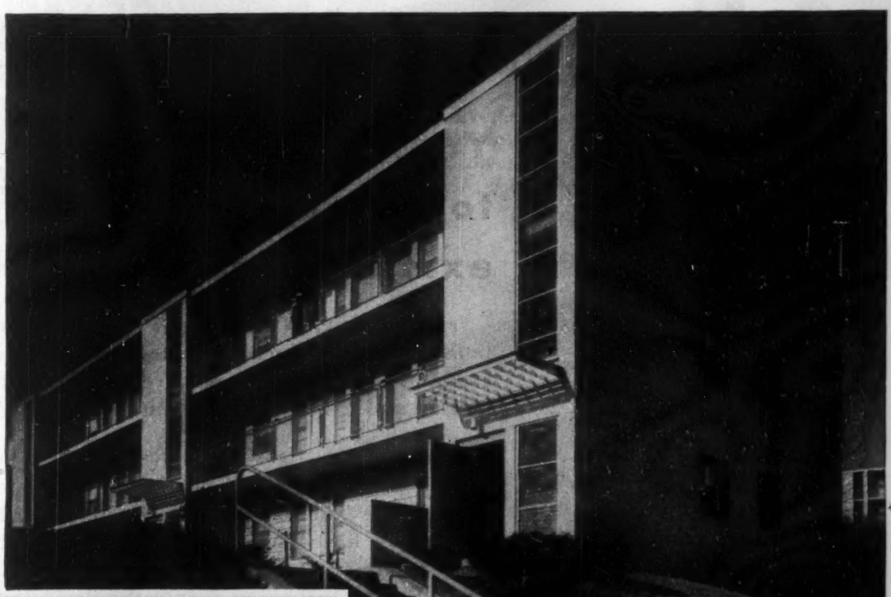
Armstrong Court—Dramatic design in light gray brick.

Architect: Holden, McLaughlin and Associates.

Associate Architect: Joseph G. Weir

General Contractor: Frouge Construction Company

Engineering Firm: Winfield S. Bondy



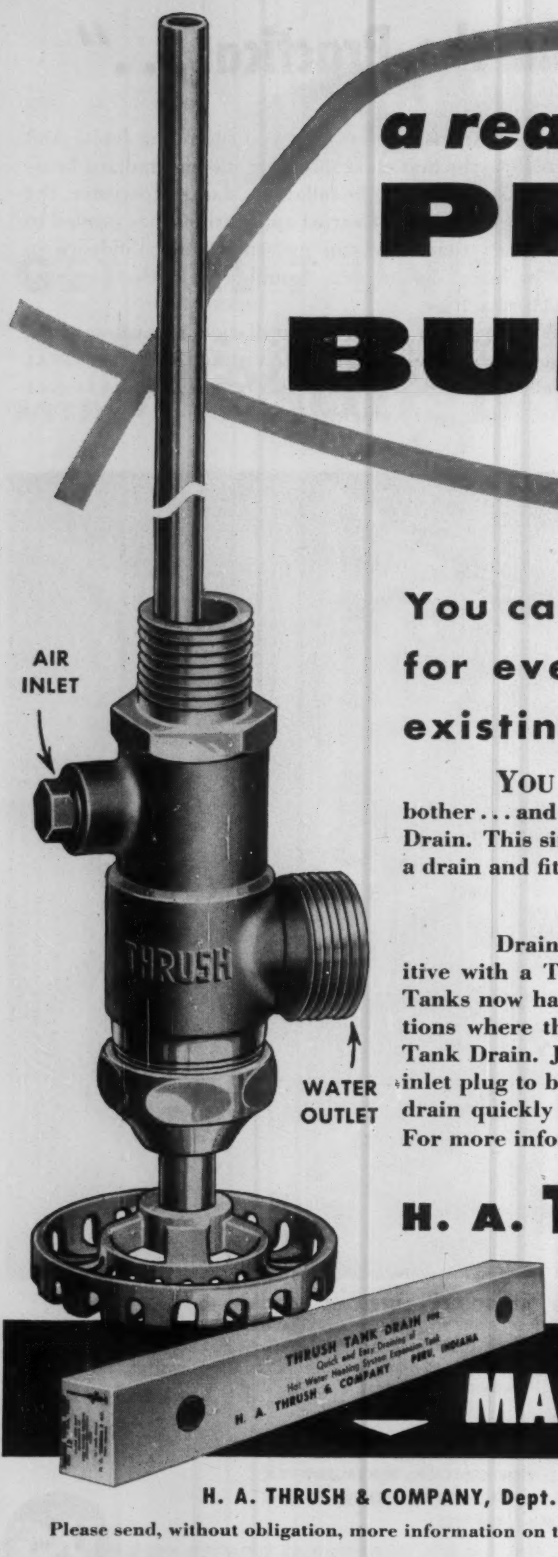
THE STURDY, HANDSOME NATIONAL PIPE porch railings, carry out the modern motif of the three-story structures. These different-level buildings are cleverly disposed on a hilly site to make the most of the relation of the various blocks to green areas.

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S NATIONAL Steel PIPE

UNITED STATES STEEL

a real... PROFIT BUILDER


AIR INLET
THRUSH
WATER OUTLET
THRUSH TANK DRAIN FOR
Quick and Easy Draining of
Hot Water Heating System Expansion Tank
H. A. THRUSH & COMPANY PERU, INDIANA

You can sell a THRUSH Tank Drain for every expansion tank on any existing installation

YOU CAN SAVE your customer money, save yourself time and bother . . . and make a profit, too, by selling and installing Thrush Tank Drain. This simple, inexpensive Tank Drain combines an air tube with a drain and fits any drain tapping. Two lengths of tube are available.

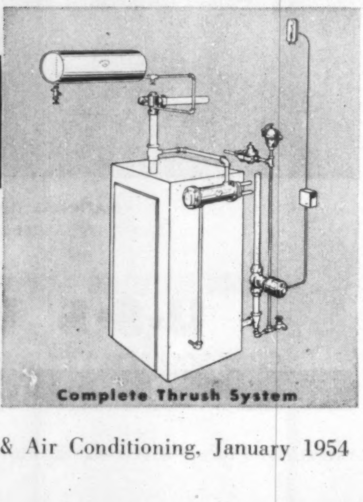
REDUCES DRAINING TIME!

Draining waterlogged expansion tanks is simple, quick and positive with a Thrush Tank Drain. While all genuine Thrush Pressure Tanks now have Thrush Vacuum Breaker, there are many old installations where the tank has only one drain tapping. Sell them a Thrush Tank Drain. Just screw it into the drain tapping. Then remove the air inlet plug to break the vacuum and open the water outlet. The tank will drain quickly and completely. It's a profit item you can sell every day. For more information see your wholesaler or use the coupon below.

H. A. THRUSH & COMPANY

NEATLY BOXED

MAIL NOW!


Complete Thrush System

H. A. THRUSH & COMPANY, Dept. E-1, PERU, INDIANA

Please send, without obligation, more information on the Thrush Tank Drain.

NAME ____________________

ADDRESS ____________________

CITY ____________________ STATE ____________________

1 *of the many reasons why you will find it pays to sell Chrysler Airtemp*

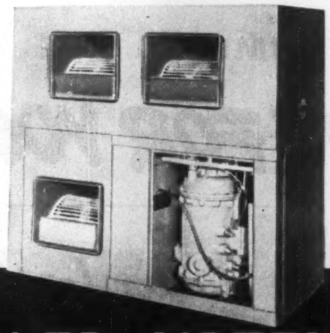
Your prospects **know** and **respect** the CHRYSLER AIRTEMP **name!**

● The great majority of buyers of "Packaged" Air Conditioning are "first time" buyers. To make up for their lack of knowledge based on personal experience, they prefer the product with a brand name they know—and know they can trust. Because most people know and respect the Chrysler Airtemp name, associate it with engineering leadership, have confidence in the quality of the products which carry it . . . you will find "Packaged" Air Conditioning by Chrysler Airtemp *easier to sell.* With Chrysler Airtemp you don't have to sell the name as well as the product . . . the name *helps you sell* the product!

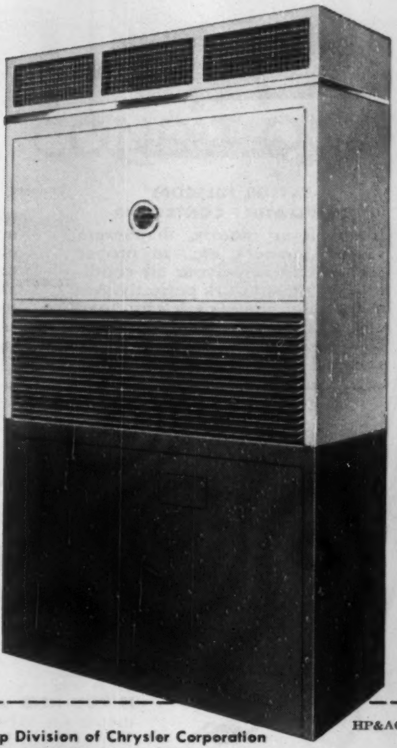
But name recognition and prestige is only one of so many important reasons why it will pay you to sell Chrysler Airtemp. Check seven more of these reasons in listing at left. Then fill out and mail convenient coupon which appears below for complete facts of the most profitable proposition in "Packaged" Air Conditioning today. *Do it now!*

7 *more advantages you sell with when you sell Chrysler Airtemp . . .*

- **More Units in Use**—Chrysler Airtemp pioneered "Packaged" Air Conditioning in 1937, has more units in use today than any other manufacturer.
- **Advanced Engineering** by Chrysler Airtemp offers your customers features that mean more because they do more for them.
- **Lower Installation Cost**—super-quiet operation permits use within or very close to areas to be cooled, reducing amount of ductwork required. All units shipped completely factory-assembled and tested.
- **Assured Dependability**—all units manufactured to exacting standards of precision in a windowless, completely air conditioned factory. Each unit is thoroughly inspected and tested using special equipment and methods, to assure dependable performance in the field.
- **More Complete Line**—9 models meet all requirements.
- **More National Advertising** to all prospects and specific benefit advertising to individual businesses—the best markets for "Packaged" Air Conditioning.
- **More Local Selling Helps**—the broadest line of tested and proved local selling helps for dealers.



New "Packaged" Air-Cooled Air Conditioners—no water needed, no plumbing required. 2, 3 and 5 H.P.



"Packaged" Air Conditioners in six water-cooled models, from 2 to 15 H.P.

Guaranteed by Good Housekeeping
REPLACEMENT OR REFUND OF MONEY IF NOT AS ADVERTISED THEREIN

CHRYSLER AIRTEMP

heating • air conditioning for homes, business, industry

Airtemp Division, Chrysler Corporation, Dayton 1, Ohio

HP&AC-1-54

Airtemp Division of Chrysler Corporation
P.O. Box 1037, Dayton 1, Ohio

I would like to know more about the Chrysler Airtemp Franchise.

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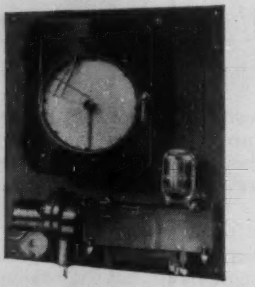
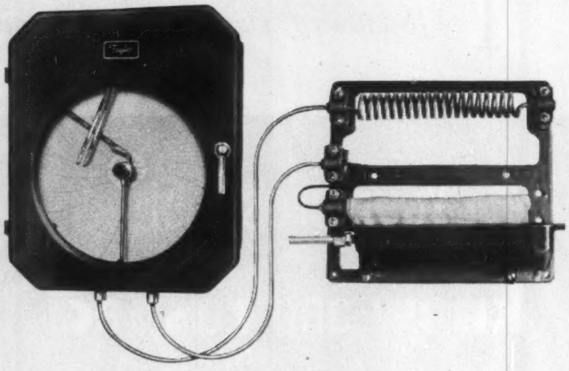


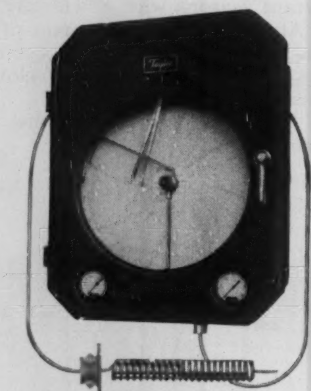
RECORDING OR RECORDING-CONTROLLING HYGROMETER with motor driven fan

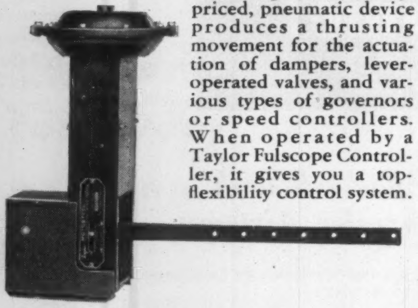
Recommended where air circulation would be inadequate to assure average condition across bulbs. Motor-driven fan produces air velocity of more than 600 ft. per minute.

RECORDING OR RECORDING-CONTROLLING HYGROMETER with bottle or continuous water feed

Recommended under the following conditions: Good air circulation; panel advantageously located within apparatus room or duct for best circulation across the bulbs. Available with bottle-feed or continuous water supply.

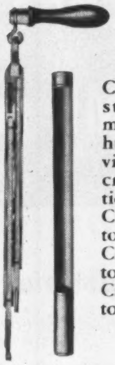






TAYLOR MOTOSTEEL* LEVER MOTOR

This simple, moderately-priced, pneumatic device produces a thrusting movement for the actuation of dampers, lever-operated valves, and various types of governors or speed controllers. When operated by a Taylor Fulscope Controller, it gives you a top-flexibility control system.



TAYLOR SLING PSYCHROMETER

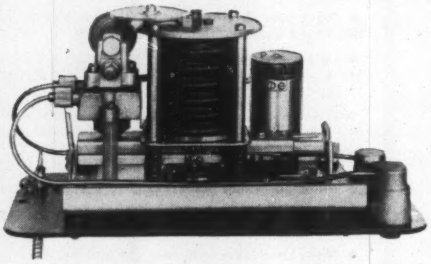
Considered the basic standard for accurate measurement of relative humidity, since it provides a simple means for creating suitable circulation of air. Length 12″. Catalog No. 1321: 30° to 200°F in 1° divisions. Catalog No. 1322: 20° to 120°F in ½° divisions. Catalog No. 1324: 25° to 40° in 1/10° divisions.

TAYLOR FULSCOPE* TEMPERATURE CONTROLLER

Keeps lever motors, diaphragm valves, dampers, etc., in proper sequence to make your air conditioning system work perfectly. Automatically compensates for load changes. Controls refrigeration compressors. Gives you automatic seasonal changeover.

TAYLOR TRANSAIRE* TEMPERATURE TRANSMITTER

New force-balance pneumatic transmitter that meets all normal air conditioning requirements with simple operation, positive transmitting action and rapid response to temperature changes. Ideal where zones are remotely located from centralized control room.



ALL OF THESE INSTRUMENTS ARE

CUT OUT FOR YOU!

IF YOU NEED any of the instruments on this page, ask your Taylor Field Engineer or write for **Catalog 5.** Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada. *Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.*

Taylor Instruments

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IN HOME AND INDUSTRY

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Monarch

SPRAY NOZZLES

for

AIR WASHERS . . . COOLING TOWERS

These are "non-clogging" nozzles with a single large tangential lead hole to the swirl chamber that will never clog from any impurities small enough to pass through the orifice. Swirl chamber is conical on both ends and pivots liquid like a top to produce an exceptionally fine, evenly distributed, balanced spray of about 80° included angle. Wider spray angles up to 130° can be furnished to order.

Standard material Brass. Also available in Stainless Steel and Monel. Pipe sizes from ⅛" to 1". ¼" size is 1-5/16" long and made from ⅝" square stock.

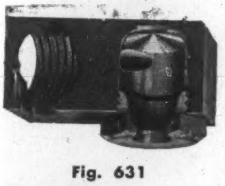


Fig. 631

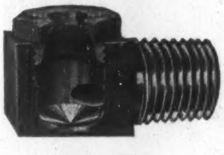


Fig. 629

CAPACITIES: GALLONS PER HOUR

Sizes			Lbs. Operating Pressure					
Pipe	Orifice	Lead	10	20	30	40	60	100
⅛" OR ¼"	69	69			2.9	3.3	4.0	5.1
	61	61		4.0	5.0	5.5	7.0	8.7
	61	53	4.4	6.2	7.5	8.3	10.3	13.0
	53	53	5.8	8.2	9.8	10.9	14.1	17.3
	49	49	9.1	11.1	13.2	15.0	19.5	24.6
	3/32"	3/32"	11.8	16.6	20.4	23.4	29.0	36.5
	1/8"	3/32"	19.5	27.6	33.3	39.1	49.0	60.0
	1/8"	1/8"	24.3	34.6	42.8	50.0	64.0	78.5
	11/64"	1/8"	31.5	46.1	57.0	64.1	81.9	105
	3/16"	5/32"	52.2	75.0	92.5	109	138	189
¼"	7/32"	3/16"	78.0	112	138	163	205	257
	7/32"	7/32"	82.0	121	152	180	225	300

HUMIDIFIERS . . . . . . AIR CONDITIONERS

The H-261 and F-80 brass nozzles produce the finest, softest, fog-like spray possible with low direct pressure only. Popular sizes are nozzle #3.00 and #5.00 tested either 80° or 120° at 25 pounds.

All Brass construction with 120 mesh Monal screen strainers and ⅛" or ¼" female or ¼" male pipe connection in the F-80 and ¼" male only in the H-261. The H-261 is 1-⅜" overall and the F-80, 1-⅞".

GALLONS PER HOUR

Nozzle No.	Lbs. Operating Pressure				
	25	40	60	80	100
1.35		.57	.69	.83	.92
1.65		.75	.89	.99	1.12
2.00		.94	1.14	1.28	1.40
2.50		1.13	1.45	1.64	1.86
3.00	1.03	1.39	1.62	1.85	1.95
3.50	1.36	1.77	2.11	2.46	2.80
4.00	1.56	2.00	2.42	2.77	3.16
4.50	1.86	2.32	2.77	3.21	3.68
5.00	2.20	2.88	3.57	4.09	4.59
5.50	2.22	2.96	3.75	4.31	4.78
6.00	2.55	3.35	4.01	4.78	5.23
7.00	2.90	3.91	4.60	5.17	6.00

Fig. H-261

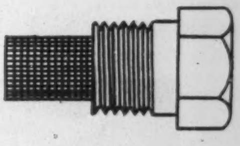
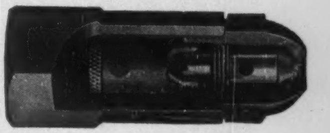
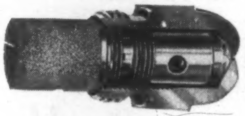


Fig. F-80



OIL BURNERS



Monarch Stainless Steel Nozzles for high pressure gun-type oil burners are the Industry yardstick for nozzle performance. Each nozzle individually tested for capacity, spray angle and uniformity of spray on No. 2 fuel oil weighing 7.16 pounds per gallon at 74°F. and 34 S. S. U. viscosity at 100°F. Standard spray angles are 30°, 45°, 60°. 70° and 80° in small sizes.

Standard capacity sizes (GPH at 100 psi.): .60, .75, .85, 1.00, 1.20. 1.25, 1.35, 1.50, 1.65, 1.75, 2.00, 2.25, 2.50, 3.00, 3.50, 4.00, 4.50, 5.00, 5.50, 6.00, 6.50, 7.00, 7.50, 8.30, 9.50, 10.50, 12.00, 13.80, 15.30, 17.50, 19.50, 21.50, 24.00, 28.00, 30.00 to 60.0 in 5.00 GPH steps and 60.0 to 100.0 in 10.00 GPH steps.

Write for complete catalogs and prices

MONARCH MANUFACTURING WORKS, INC.

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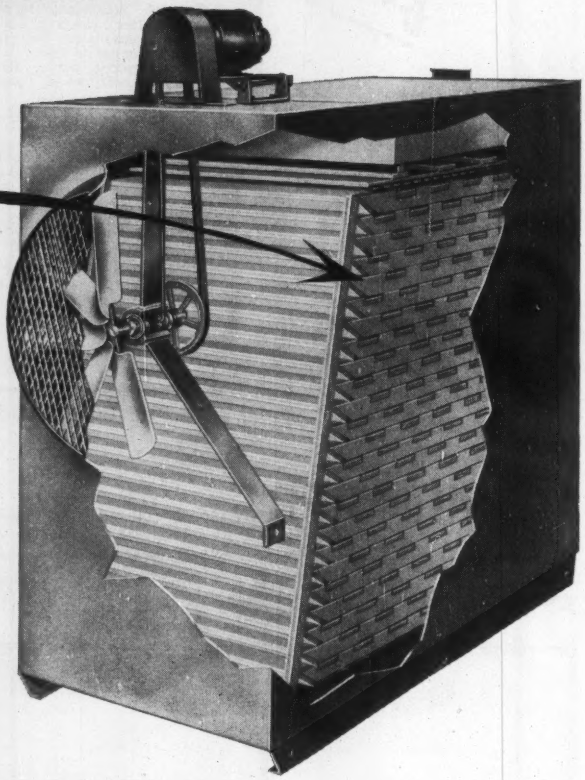
CANADIAN SALES AGENT (EXCEPT B.C.): CANADIAN GENERAL FILTERS LTD., 2679 DANFORTH AVE., TORONTO 13.

HALSTEAD & MITCHELL COOLING TOWERS

20-Year Guarantee!

On the Wetted Deck Surface of Koppers Pressure-Treated Wood



Here's the industry's greatest cooling tower value . . . "built like a battleship" for 20 years of foolproof performance. Halstead & Mitchell's pioneering in exclusive use of Koppers pressure-treated wood in the wetted deck surface makes possible the unprecedented 20-year guarantee against rotting, and provides the industry's most effective deterrent against fungi growth. Economical, lastworthy . . . the special H & M design for water distribution eliminates, thru the use of an efficient gravity-type distributing pan, extra pumping head required on spray type towers, also cuts down windage losses due to atomizing of water. The complete assembly is with Everdur bolts . . . disassembly is easy even after years of service. Easily accessible for cleaning through inlet on back of towers in all sizes.

MORE EFFICIENT IN ANY INSTALLATION

H&M # CT-4000 Induced-Draft Cooling Tower supplying the condensing water for 20 HP and 10 HP water-cooled condensing units in 3-story jewelry storeroom air conditioning. Note open-type distributing pan. This installation also has remote water basin in basement for year-round operation.

2 TONS to 100 TONS

A cooling tower for all applications, from 2 to 100-ton capacities—made by Halstead & Mitchell, one of the world's largest manufacturers of water-cooled Cleanable Condensers.

AT LEADING WHOLESALERS EVERYWHERE

Write for descriptive bulletin and information on engineering helps.

HOUSING—10 gage (1/8"+) sheet-steel case with 3 coats Bitumastic lining. Electrically welded cabinet. All bolts used are Everdur for ease of disassembly after years of service.

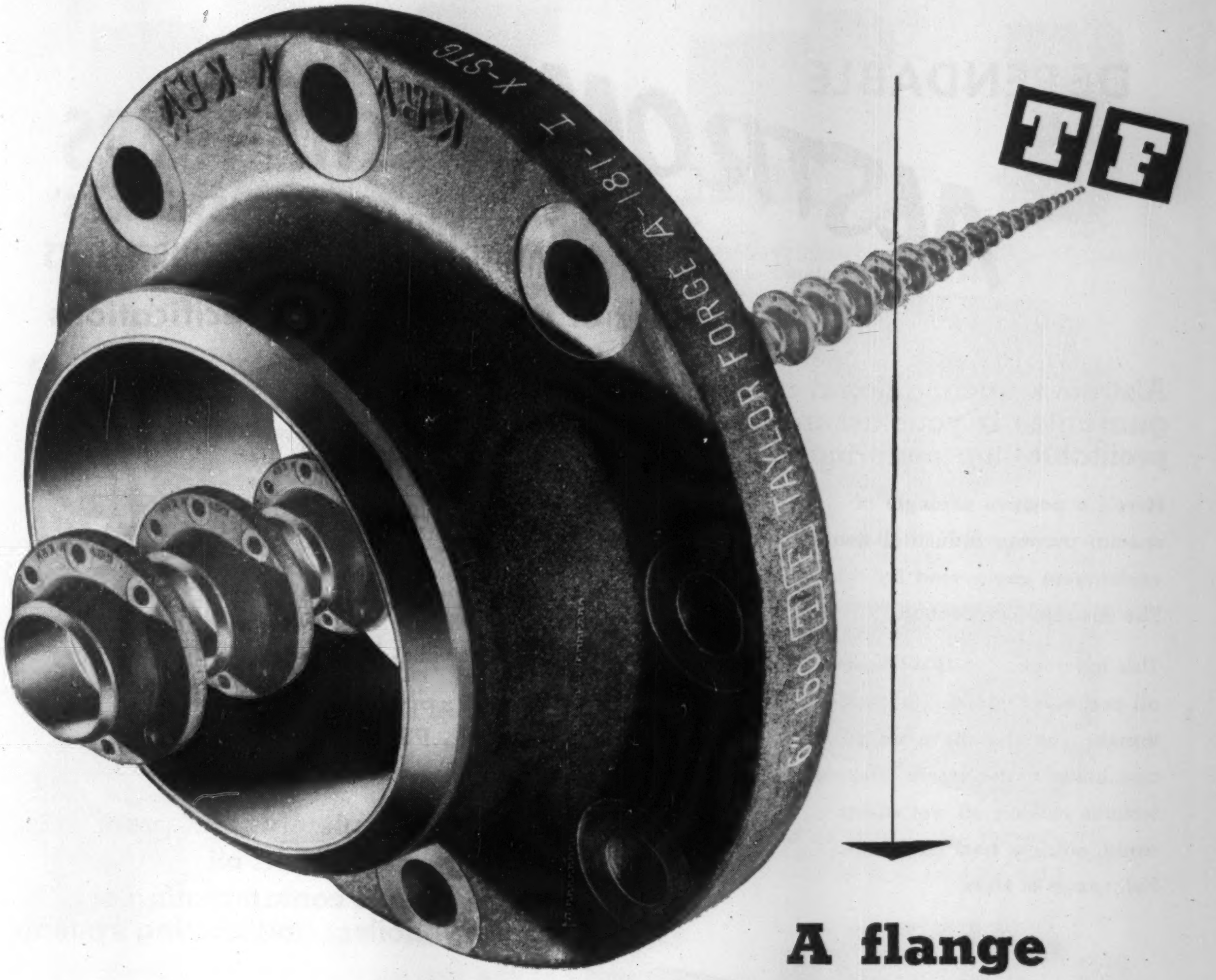
WATER DISTRIBUTION—Gravity type distributing pan eliminates extra pumping head, cuts down windage losses, due to atomizing water.

FAN AND DRIVE—Quiet-operating stainless steel 8-bladed fan, stainless steel shaft, chrome-dipped rust-proofed pulleys. Cast iron bearing supports. Adjustable belt tension.

HM

Halstead & Mitchell

OFFICES: BESSEMER BUILDING • PITTSBURGH 22, PA.



A flange with a background...

You are looking at a flange with a history. Taylor Forge made the forged steel flange and in a sense the forged steel flange made Taylor Forge. It was Taylor Forge, back in 1905, who made the first forged steel flanges on a commercial scale . . . and it is Taylor Forge who has guided flange development across the past half century.

Through the first threaded flange form, the bolted Van Stone form, and the perfected welding neck form pictured here, Taylor Forge has undeniably contributed more to flange development than any other organization*.

Taylor Forge Welding Neck Flanges are a part of the WeldELL® line—the line that more than 20 years ago gave industry the first complete line of fittings for pipe welding. The organization that led development is still leading . . . in scope of types, sizes, weights, materials . . . in quality and downright value!

For up-to-the-minute facts see your Taylor Forge Distributor

TAYLOR FORGE

TAYLOR FORGE & PIPE WORKS, General Offices & Works: P.O. Box 485, Chicago 90
Plants at: Carnegie, Pa., Fontana, Calif., Gary, Ind., Hamilton, Ont., Canada

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* When pressures rose from the old 150- and 300-pound standards to 400, 600 and finally 900 pounds, it was largely the exhaustive research of Taylor Forge that supplied the formulas for determining stresses in flanges for any given condition of loading. Among many examples: the Taylor-Waters formula, published in 1927, became and still is the basis of recognized practice for flanges in sizes through 24". Again, in 1938 Taylor Forge published the first edition of the now authoritative "Modern Flange Design" based on methods proposed by E. O. Waters, D. B. Rossheim, D. B. Wesstrom and F. S. G. Williams, Taylor Forge Manager of Engineering Standards. (ASME Trans., Apr. 1937)

DEPENDABLE ALSTROM HEAT EXCHANGERS

SATISFY YOUR CUSTOMERS' HEATING OR COOLING REQUIREMENTS

...in stock or custom-built to specifications

Alstrom's unconditional manufacturer's guarantee is your assurance of profitable, top performance!

Here's a positive example of special purpose industrial heat exchangers engineered by The Alstrom Corporation.

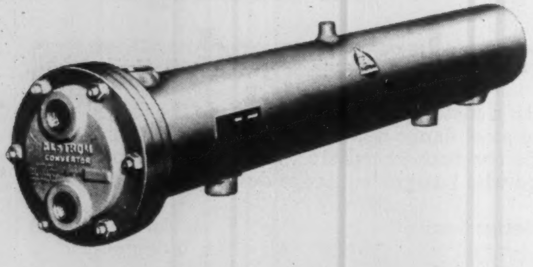
This ingenious "double-transfer" oil preheater contains a capillary transfer chamber between oil tubes and boiler water which positively isolates leaking oil, yet effects rapid, efficient heat exchange. Full range of sizes.

ALSTROM
OIL PREHEATER

"SAFE GUARD"
OIL PREHEATER

APPROVED BY THE NEW YORK CITY BOARD OF STANDARDS AND APPEALS NO. 425-51-S.A.

- completely "fuel-proof"
- really heats oil
- ends contaminating of boilers and heating systems



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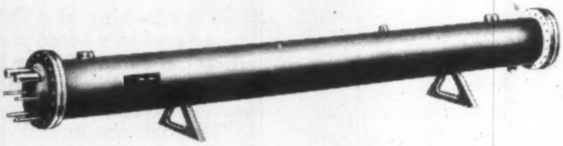
Service-tested, modern design is expertly engineered for present day hot water requirements.



WATER CHILLERS

Alstrom compact, easy to install chillers incorporate all the features preferred by experienced contractors.

Alstrom precision engineering means properly designed and ruggedly constructed heating and cooling equipment for practically every purpose. Alstrom engineers can also provide you with expert on-the-job guidance.

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Manufacturers of industrial heat exchangers since 1939

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WATER HEATER SINCE 1939 ALSTROM NY NY
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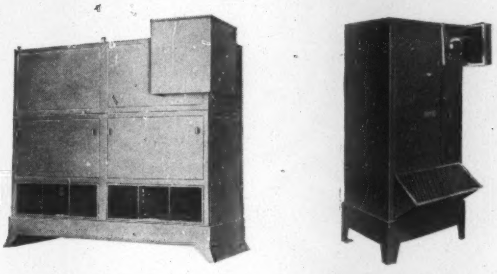
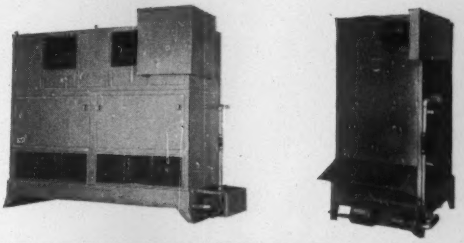


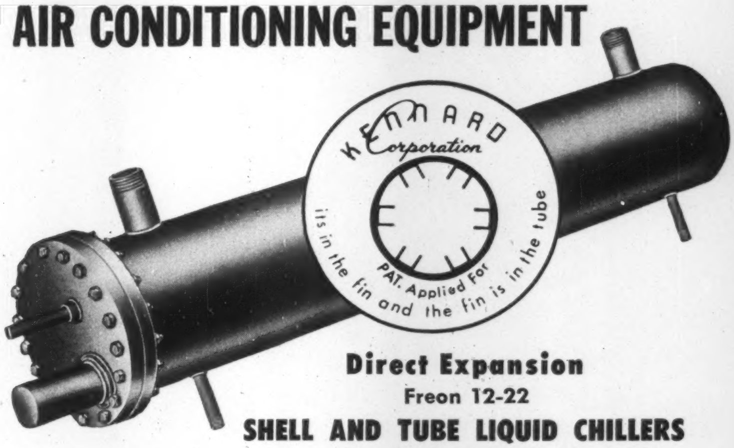
COOLING TOWERS—Air Conditioning, Refrigeration, or Industrial Applications. Outdoor-Indoor. 3 to 75 Tons. Catalogs No. CT-1 and KT-2.



EVAPORATIVE CONDENSERS—Indoor-Outdoor. 3 to 75 Tons. Catalogs No. EC-1 and EK-3.

KENNARD *Engineered*

AIR CONDITIONING EQUIPMENT



Direct Expansion

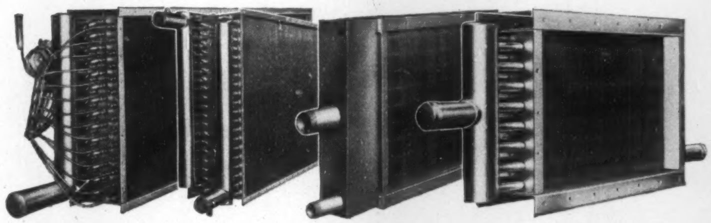
Freon 12-22

SHELL AND TUBE LIQUID CHILLERS

Kennard research leads the field with this New and Revolutionary Liquid Chiller.

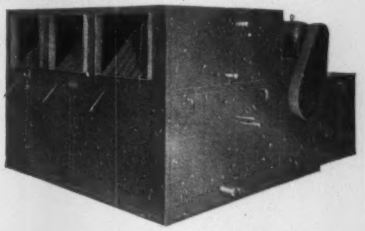
- ★ Internally finned tube.
- ★ Downward feed of refrigerant and oil.
- ★ Guaranteed oil return.
- ★ Controlled refrigerant distribution.
- ★ No freon head gasket.

Sizes 2 to 200 tons ***Write for Catalog LC-1.***

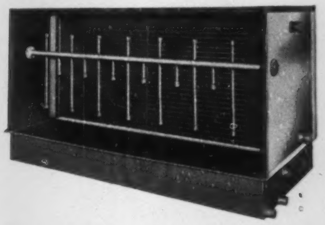


FINNED COILS—Direct Expansion Coils, Water Coils, Steam Distributing Tube Coils, Standard Steam Coils. Sizes up to 36″ wide x 120″ long. Catalog No. BC-1.

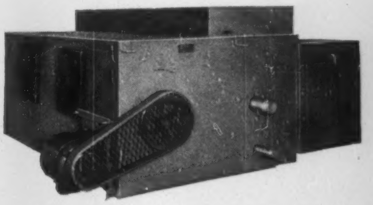
Write for name of nearest representative and catalogs needed.



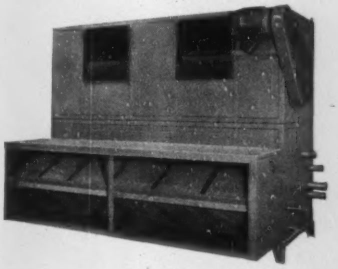
MULTI-ZONE UNITS—Sizes up to 36 sq. ft. Cooling Coil Face Area. Catalog MZ-1.



SPRAYED COIL DEHUMIDIFIERS—56 Sizes. Coil Face Areas to 81 sq. ft. Catalog No. SC-1.



HEATING AND VENTILATING UNITS—Air Volumes 300 to 28,800 CFM. Catalog No. HV-1A.



AIR CONDITIONING BLOWER UNITS—13 Sizes. 300 to 21,600 CFM. Horizontal or Vertical. Catalog No. AC-1.

KENNARD CORPORATION • 1817 S. HANLEY ROAD
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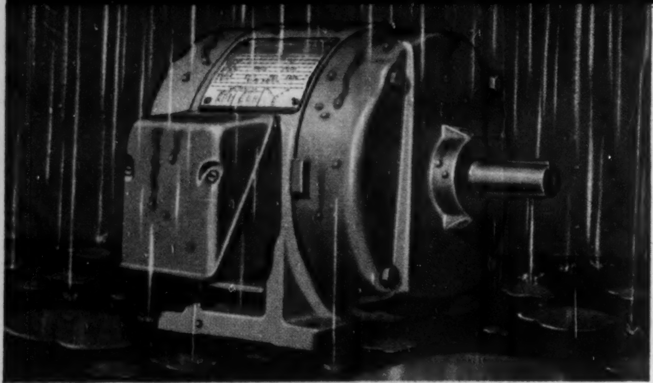
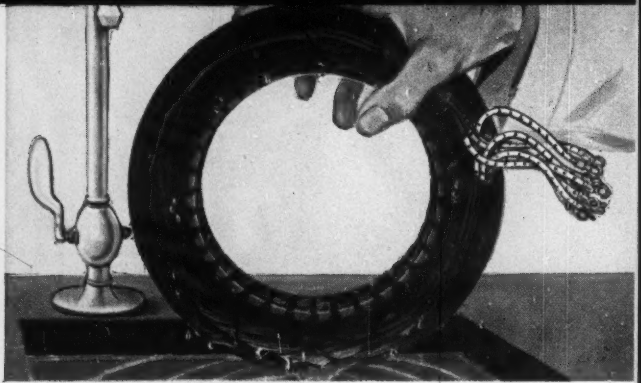
GENERAL ELECTRIC
TRI-55 CLAD INDUCTION MOTOR

YOU GET EVEN LONGER MOTOR LIFE



PHYSICAL PROTECTION INCREASED 60 PER-CENT by a complete redesign of cast-iron frame and end shields. This motor is suitable for many jobs where ordinary dripproof motors should not be applied.



EXTRA ELECTRICAL STRENGTH is assured by use of new polyester film insulation. A silicone coating, Dri-film,* virtually eliminates stator insulation failure caused by moisture.

*REG. U.S. PAT. OFF.

TRI 55 CLAD THE LEADER IN MODERN MOTOR DESIGN

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GENERAL ELECTRIC ANNOUNCES...

THE ALL-NEW TRI/55/CLAD MOTOR

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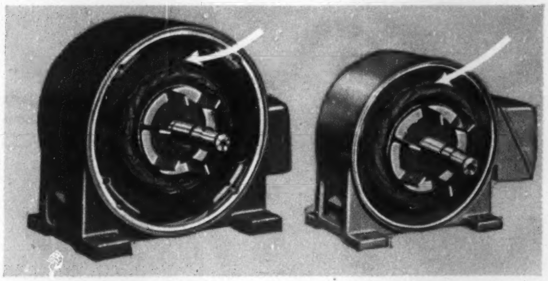


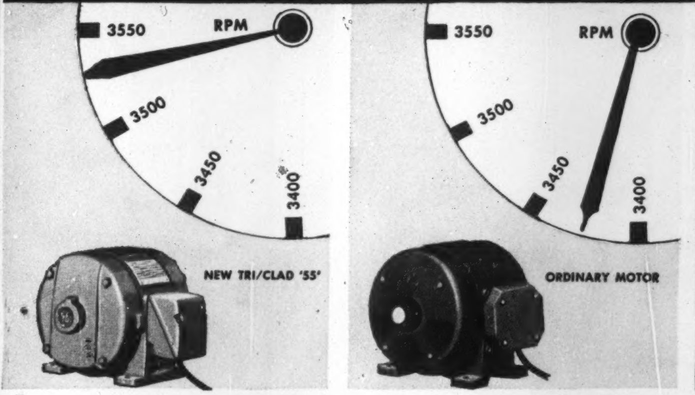
LIGHTER, SMALLER Tri/Clad '55' motors have been made possible through better use of space within the frame. Active materials (magnetic steel, copper) have not been sacrificed.

Complete Line of Dripproof, Enclosed Motors and Gear-Motors Available in Most Ratings in 1954

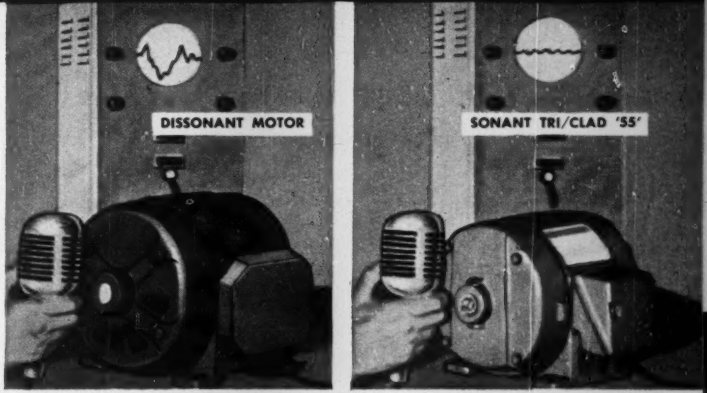
Here's the all-new Tri/Clad '55' motor — now available in NEMA 182 and 184 frame sizes.

You can get complete information on this dramatic motor achievement by writing for bulletin GEA-6013 on Tri/Clad '55' Dripproof motors, GEA-6012 on Tri/Clad '55' Enclosed motors, or GEA-6027 on Tri/Clad '55' Gear-motors, or by contacting your nearby G-E Apparatus Sales Office or G-E Motor Agent. General Electric Company, Section 648-1, Schenectady 5, N, Y.

YOU GET EVEN BETTER PERFORMANCE



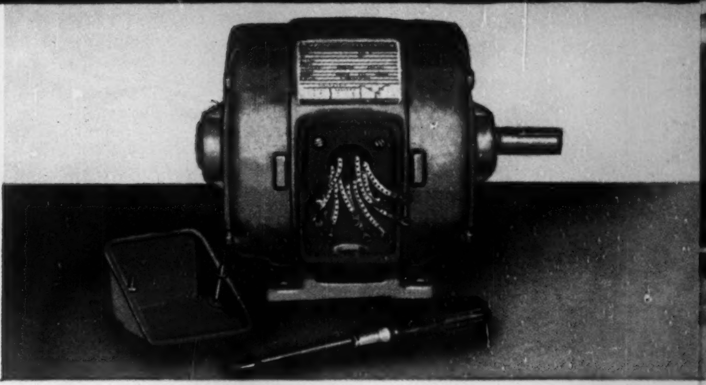
HIGHER FULL-LOAD SPEEDS is only one of many improved characteristics of this new G.E. motor. Above shows comparison of an ordinary motor with the Tri/Clad '55' — both rated at 3600 rpm.



SONANT OPERATION of the new Tri/Clad '55' motor has been laboratory tested and proven. Motor operates at reduced noise level, and operating sound is pitched to a more pleasant frequency.

YOU GET EVEN MORE INSTALLATION AND MAINTENANCE SAVINGS

NEW BEARING SYSTEM allows this motor to run longer than other motors without regreasing. One reason—greatly improved synthesized grease with 8 times the mechanical stability of ordinary grease.



EASIER TO SERVICE, the new Tri/Clad '55' has larger conduit box diagonally split for simplified wiring. Perma-numbered leads mean that even clipped and stripped wires are instantly identified.

Progress is our most important product

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NEW

HEAT SAVING EFFICIENCY

with Mundet 85% Magnesia

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85% MAGNESIA
HEAT insulation
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Now available in pipe covering and block insulation, Mundet Custom-Molded 85% Magnesia permits new heat-saving efficiency.

You benefit from these advantages when you use Mundet 85% Magnesia Insulation.

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It cuts easily and cleanly, even without canvas support. No chipping, crumbling or "powdering." Blocks score cleanly.
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Only 11 lbs. per cubic foot density. Even larger sizes and thicknesses are easy for one man to handle.
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Precision manufacture on the latest type of equipment insures uniform standards.
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Greater "ductile strength" is built into the insulation. It does not "powder," settle or disintegrate even with heavy vibration. It withstands handling and may be removed and reapplied if necessary.
- ***Does not Shrink or Warp***
Steam or water leakage does not affect it. It does not shrink or warp even after soaking.
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No unsightly, inefficient "bagging." Mundet 85% Magnesia insulation retains its neat appearance and effectiveness.
- ***Precision Pipe Fit***
No spaces are left for the escape of heat. The whole heated surface is snugly enclosed.

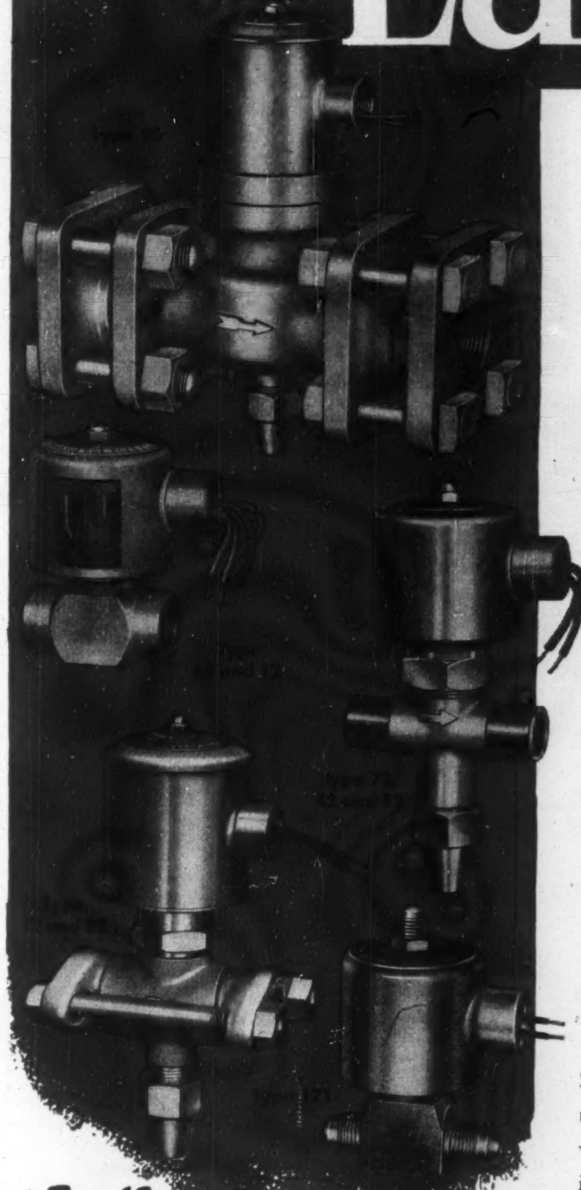
Write for specification information and recommendations. Mundet Cork Corporation, Insulation Division, 7113 Tonnelle Avenue, North Bergen, N. J.

INSULATION FOR HIGH AND LOW TEMPERATURE

no matter how Large

or SMALL the application

there's a **SPORLAN** Peak Performance **Solenoid Valve** *to fit your needs!*



Nothing can touch the Peak Performance of SPORLAN SOLENOID VALVES... for Peak Performance is Wound Right Into The Sporlan Solenoid Coil.. *then Permanently Sealed In!*

Sporlan solenoid coils are layer wound (not random wound) and interwoven with layers of cotton thread. This construction prohibits build-up of damaging electrical pressure across the turns of wire, thus minimizing possibilities of coil burnouts. After the coils are wound, they are twice dipped in high temperature insulating and water repellent varnish to thoroughly impregnate the cotton thread insulation, and are baked after each coating.

As a final precaution, the coils are then dipped in a protective sealer, and again baked to prevent any moisture infiltration.

SPORLAN Type 171 Solenoid Pilot Control offers the latest developments in the field of Pilot Controls, which Sporlan has pioneered for many years. It is made in *one size only* and used *in place of* extra large Solenoid Valves on F-12, and F-22. *It costs less,* is more economical to install, and assures positive shut-off of the liquid line.

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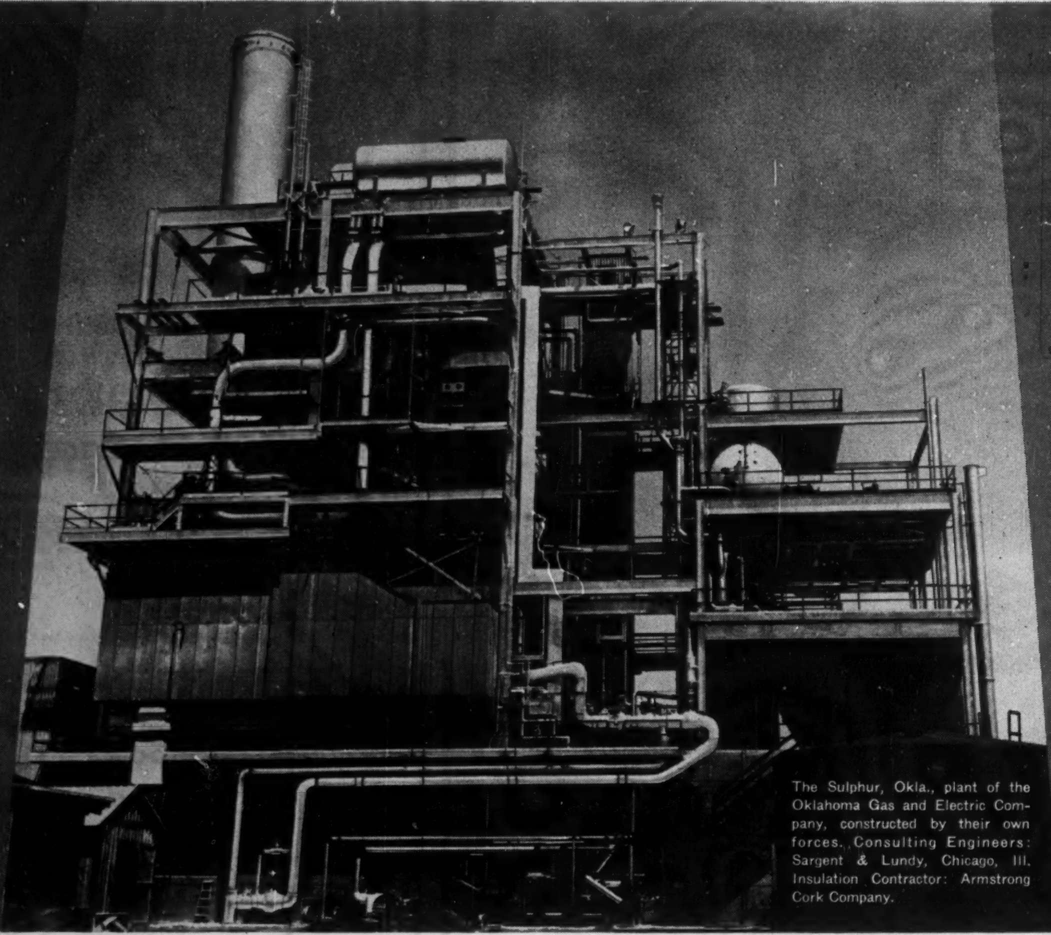

The Sulphur, Okla., plant of the Oklahoma Gas and Electric Company, constructed by their own forces. Consulting Engineers: Sargent & Lundy, Chicago, Ill. Insulation Contractor: Armstrong Cork Company.

They chose "*Featherweight*"® 85% MAGNESIA

TO INSULATE HEATERS, EVAPORATORS & STORAGE TANKS

To make their Sulphur, Okla., plant as modern and efficient as possible, Oklahoma Gas and Electric Company sought a modern, efficient insulation material. They found it in "Featherweight" 85% Magnesia, and used it extensively throughout the plant to insulate heaters, evaporators, storage tanks, and other equipment.

"Featherweight" 85% Magnesia is effective where temperatures do not exceed 600° F. Used in combination with K&M Hy-Temp Insulation (diatomaceous silica) its range is extended to 1900° F.

Hy-Temp is applied directly to the hot surface, and "Featherweight" is used as the second layer. The two layers are fitted with staggered vertical and horizontal joints—thus eliminating heat loss which occurs on single layer installations when the expansion of hot piping and equipment causes joints to open.

This K&M combination insulation will last the life of the equipment it serves, will withstand moisture, vibration, alternate heating and cooling, wetting and drying. Both materials are supplied in a variety of forms and thicknesses.

Your K&M distributor is an experienced applicator who will gladly give you more information about these heat-saving, money-saving K&M insulations. Or write directly to us.

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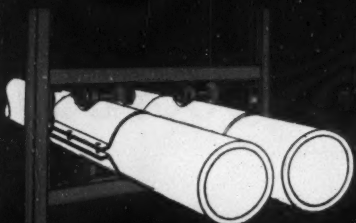

UNISTRUT® *Simplifies* PIPE RACKING *in New Sewage Treatment Plant*

Adjustable Metal Framing supports long, heavy lines—assures exact slope, permits changes or additions at any time.

Conserves Steel, Reduces Manpower Hours, Cuts Over-all Costs

Thousands of feet of piping and conduit were racked with UNISTRUT steel channel and fittings in the new Joint Sewage Treatment Plant serving the twin Michigan cities of Benton Harbor and St. Joseph. In one small area alone, over 20 tons of overhead piping were supported by UNISTRUT concrete inserts and pipe hangers.

The UNISTRUT framing system consists of steel channel members, concrete inserts, pipe rollers, brackets, clamps and fittings which are bolted together to form a trim framework of mechanical supports.

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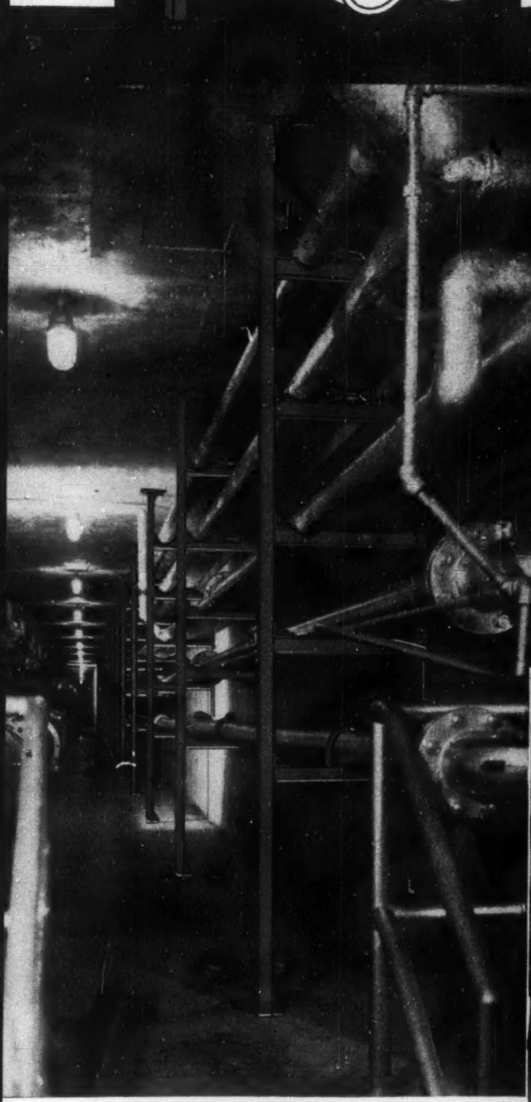
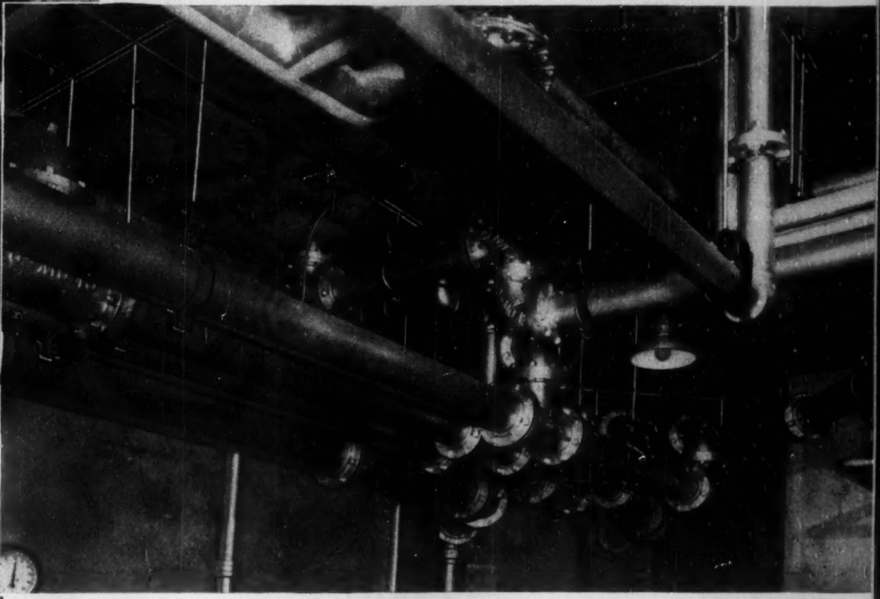


Water, gas, air and sludge lines racked on UNISTRUT stanchions. Concrete inserts have slot with sliding nut so fittings can be bolted in position desired.



Part of large overhead piping installation where over 20 tons of lines are suspended by UNISTRUT concrete inserts and pipe hangers.

U. S. Patent Numbers
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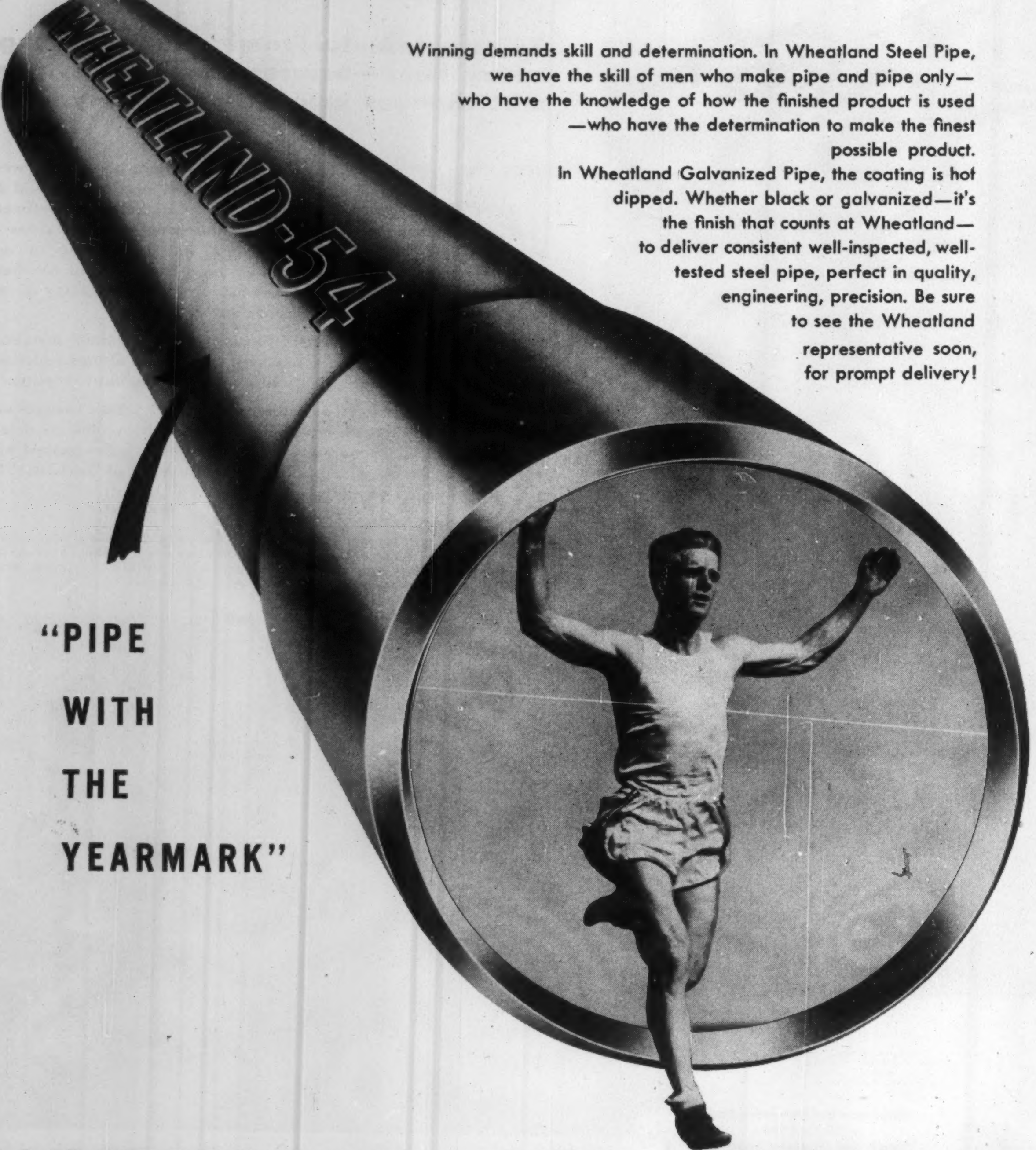

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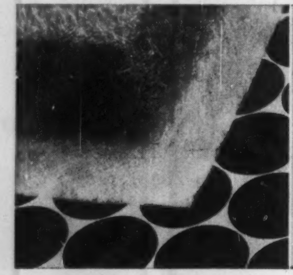

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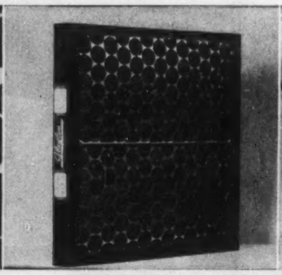

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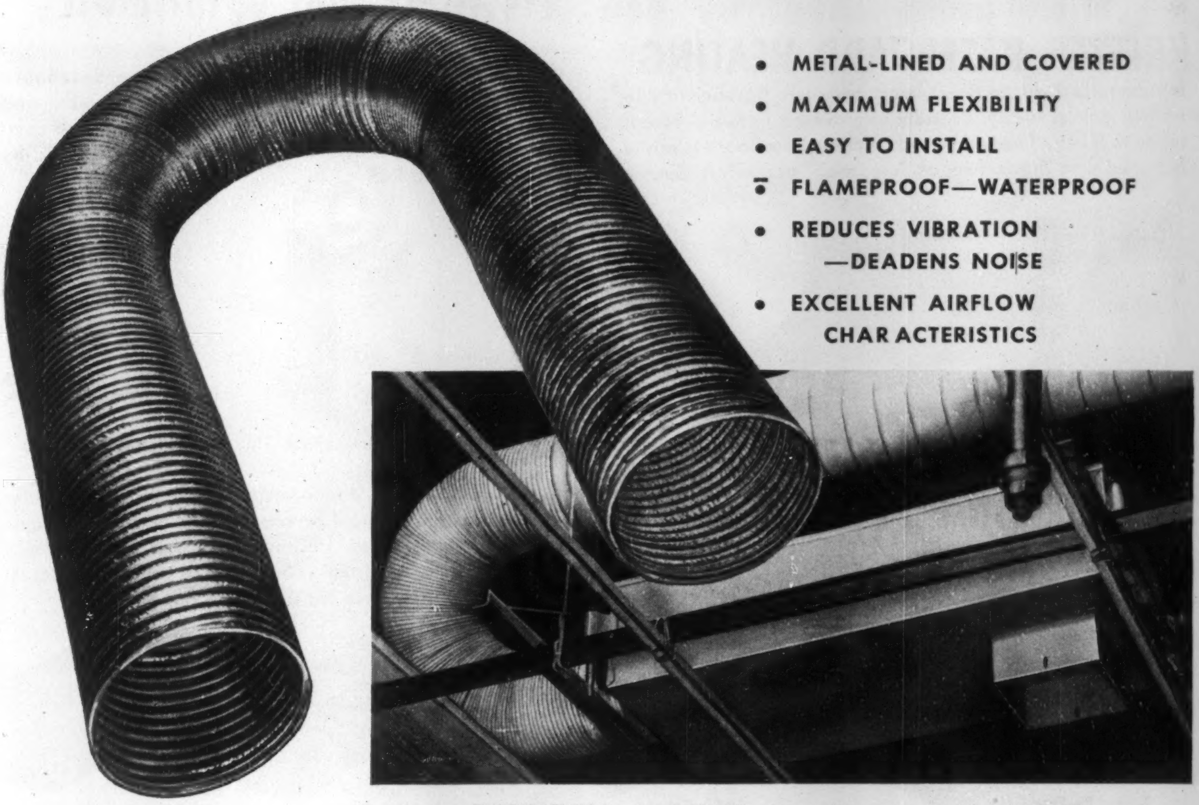

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THERMAFLEX A — is a three-ply, insulated, reinforced duct specially designed for use as a cost-saving flexible connector from main line ducts to sound boxes and diffusers in both high and low pressure air-conditioning and ventilation systems.

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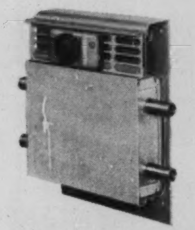
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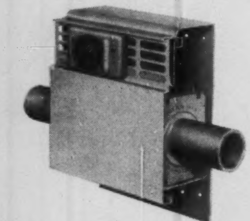
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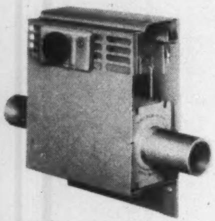
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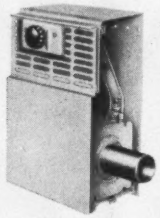
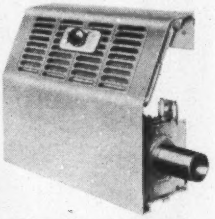

Convector, Slotted Front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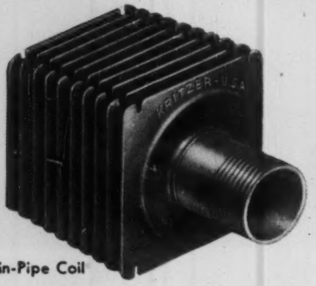
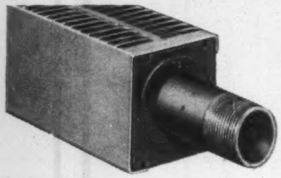
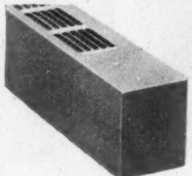
are ideal for industrial, institutional, and commercial steam or hot water heating. Ruggedly manufactured of steel or copper pipe with steel, aluminum, or copper fins permanently fitted. Heating capacities and efficiency backed by exclusive Kritzer Certified Ratings. Selection of covers and accessories provide neat finished appearance for any application.



Kritzer Fin-Pipe Coil


Utility Cover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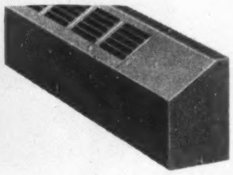
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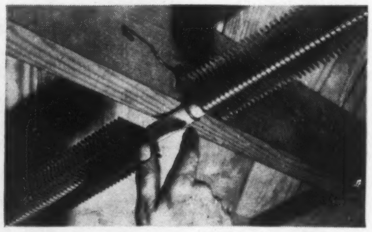

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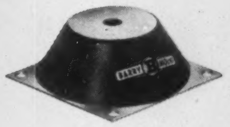
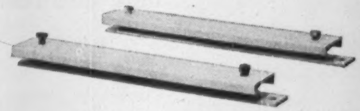


Unit Vibration Isolator



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> "To refuse to run any advertising copy in which any statement or representation is made which disparages or attacks the goods, prices, services or advertising of any competitor or of any other industry, or which contains statements or claims about an advertiser's own products or services which the publisher knows or has reason to believe are untrue or inaccurate."

A Statement
of Advertising Principles

1. GOOD ADVERTISING - - - aims to inform the consumer and help him to buy more intelligently.

2. GOOD ADVERTISING - - - tells the truth, avoiding misstatement of facts as well as possible deception through implication or omission. It makes no claims which cannot be met in full and without further qualification. It uses only testimonials of competent witnesses.

3. GOOD ADVERTISING - - - conforms to the generally accepted standards of good taste. It seeks public acceptance on the basis of the merits of the product or service advertised rather than by the disparagement of competing goods. It tries to avoid practices that are offensive or annoying.

4. GOOD ADVERTISING - - - recognizes both its economic responsibility to help reduce distribution costs and its social responsibility in serving the public interest.

—Advertising Federation of America—

Heating, Piping & Air Conditioning

☆ ☆ ☆

Therm-O-Tile

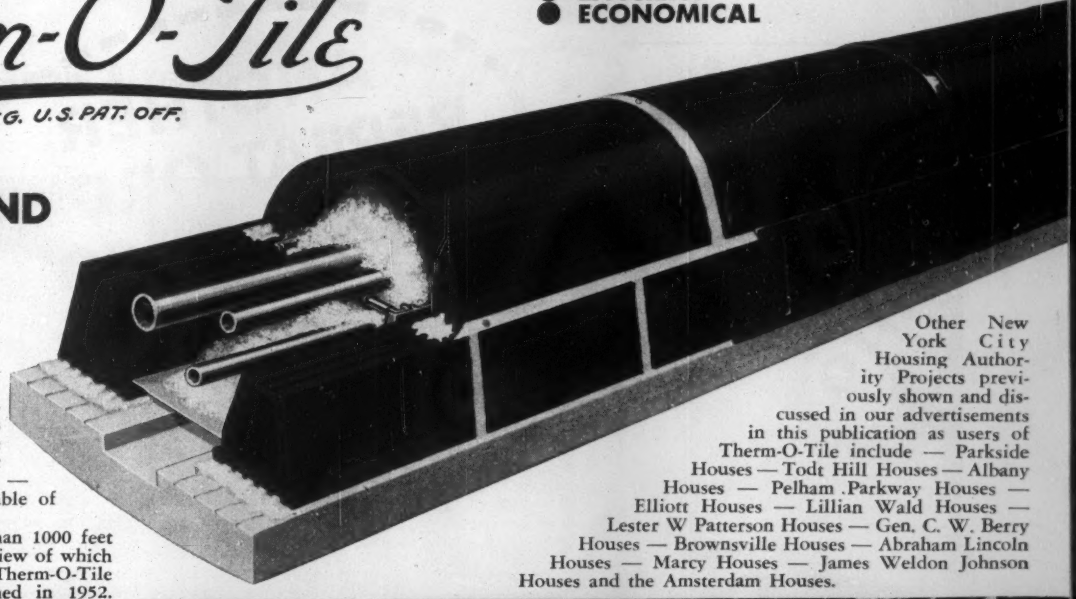
REG. U.S. PAT. OFF.

- ● PERMANENT
- ● SIMPLE
- ● EFFICIENT
- ● ECONOMICAL

UNDERGROUND STEAM CONDUIT

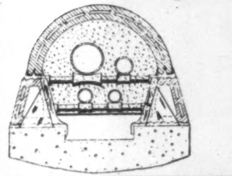
Again Therm-O-Tile Underground Steam Conduit was specified for another of the huge New York City Public Housing Administration jobs — the Van Dyke Houses — capable of housing about 1500 families.

The project required more than 1000 feet of Therm-O-Tile, an assembly view of which is shown at the right. The Therm-O-Tile portion of the job was finished in 1952.



Other New York City Housing Authority Projects previously shown and discussed in our advertisements in this publication as users of Therm-O-Tile include — Parkside Houses — Todt Hill Houses — Albany Houses — Pelham Parkway Houses — Elliott Houses — Lillian Wald Houses — Lester W Patterson Houses — Gen. C. W. Berry Houses — Brownsville Houses — Abraham Lincoln Houses — Marcy Houses — James Weldon Johnson Houses and the Amsterdam Houses.

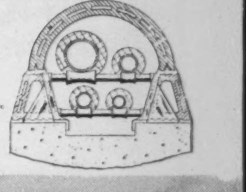
Van Dyke Houses — N. Y. City Housing Project — Heated via Therm-O-Tile



At the left we show a sectional view of Therm-O-Tile Conduit with filler type insulation. At the far right is a sectional view showing Therm-O-Tile with sectional pipe covering. We offer a wide range of designs and sizes for nearly all requirements.

For *permanently* protecting and insulating heating mains Therm-O-Tile is the simplest, strongest, most efficient and most economical conduit obtainable. It is ideal for central heating plants, airports, factories, colleges, gas plants, greenhouses, hospitals, power stations, textile mills, etc. For complete information ask for a copy of Bulletin 511.

For estimates, recommendations, specifications, etc. get in touch with the nearest Porter-Hayden office, or, any Johns-Manville Technical Service Unit.



H. W. PORTER & CO., INC.

822-H Frelinghuysen Avenue • Newark 5, N. J.

REID HAYDEN, INC.

BALTIMORE, MD. RICHMOND, VA. CHARLOTTE, N. C.

INSULATION ENGINEERS & CONTRACTORS

The most convincing stamp of user satisfaction →

ANOTHER REPEAT ORDER FOR SARCO

Lederle's new office building at Pearl River, N. Y. will house over 700 people, is equipped with Sarco heating specialties.
Architects: Eggers and Higgins. Consulting Engineers: Jaros, Baum and Bolles. Heating Contractors: Harry Hoyle Contracting Co.

18 years of repeat orders
and now again . . .

Lederle Laboratories Division American Cyanamid Co. Installs Sarco Heating Specialties

There's a good reason why Sarco Heating Specialties have been specified and used by Lederle again and again.

That reason is Sarco dependability.

Leading architects, engineers and contractors know from the long record of repeated user approval that they can depend on Sarco performance.

The Sarco heating specialties now operating in this new office building and other Lederle Laboratories buildings have been installed over a period of 18 years. Several thousand Sarco steam traps, radiator valves and traps, air eliminators, strainers, and temperature controls are giving satisfactory performance.

For dependable heating specialties and all around satisfaction, you can confidently specify Sarco.

On your request, we'd be happy to send you full information on Sarco's complete line.

FOUR REASONS WHY IT PAYS TO SPECIFY SARCO

1. **Proven Dependability**
2. **Trouble-free Service**
3. **Complete Line from One Reliable Manufacturer**
4. **Nationally Known and Preferred by Users.**

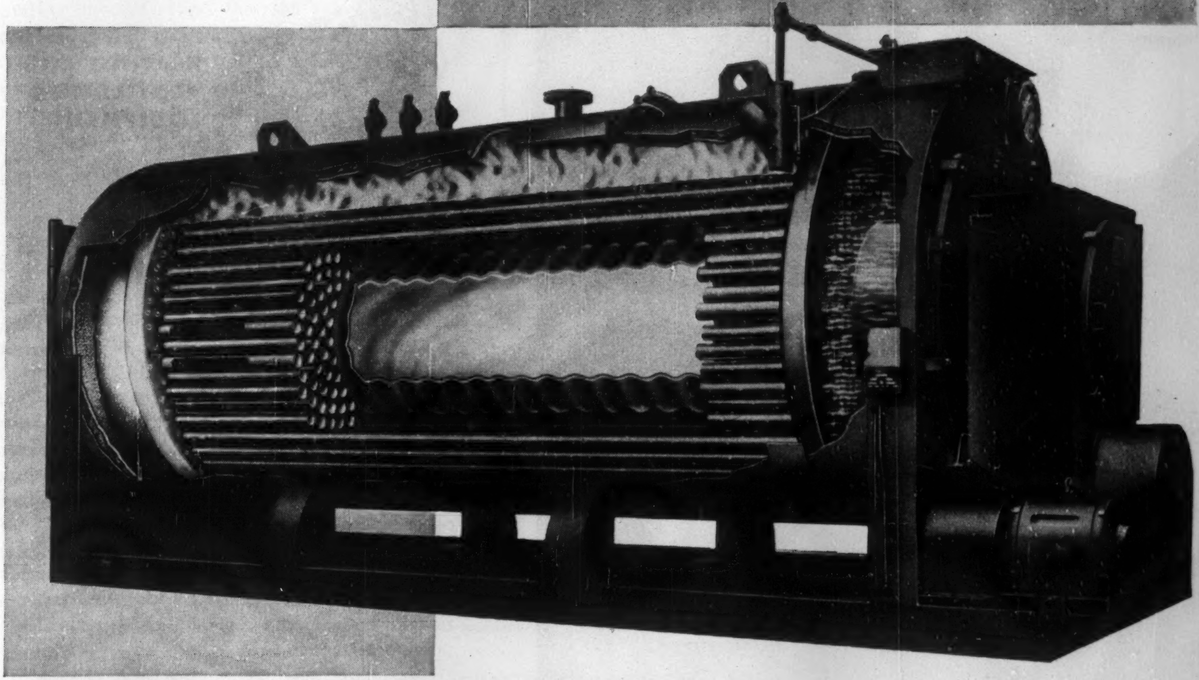
SARCO **SAVES STEAM**

SARCO COMPANY, INC., Empire State Building, New York 1, N. Y.
Sarco Canada, Ltd., Toronto 8, Ontario . . . Represented in Principal Cities

STEAM TRAPS • TEMPERATURE CONTROLS • HEATING SPECIALTIES

Radiator Valves • Traps | Strainers | Float-Thermostatic Traps | Inverted Bucket Traps | Thermostatic Traps | Water Blenders | Air Eliminators | Dial Thermometers | Self-Operated Temp. Reg.

Do You Know About *Continental's* Two Pass Design?



...and do you know it takes one man less than 30 MINUTES to open a CONTINENTAL BOILER for cleaning or inspection...

WITH THE CONTINENTAL, you get a self-contained, automatic steam generator, built of best quality steel, and featuring advanced two pass design. The two pass design eliminates baffles that may break during operation and cause gases to short circuit and destroy efficiency.

WITH THE CONTINENTAL, 80% efficiency is guaranteed. Also, the use of forced draft and the elimination of baffles results in uniform distribution of heat through all tubes... insuring long life because all tubes do equal work.

WITH THE CONTINENTAL, you'll hold boiler down-time to a minimum because the clean-out and inspection doors at both ends are hinged and can be easily opened by one man in less than ½ hour.

WITH THE CONTINENTAL, fuel is fired directly into the firing tube which is completely surrounded by water. There is no dutch-oven and there is *no* refractory-lining in the water-backed furnace. This gives you maximum heat transfer, complete combustion, a high CO_2 and a low stack temperature. By eliminating refractory in the furnace, heat is transmitted to the boiler water without being stored and wasted in heating a refractory firebox . . . Steam with less than ½ of 1% moisture is assured in high pressure boilers, and less than 1% moisture in low pressure boilers.

WITH THE CONTINENTAL, you save on fuel (U. S. and foreign patents pending on exclusive firing method). The *oil burner* uses a pressure atomizing nozzle which is easy to service—has no cups or moving parts to wear out. The *gas burner*—rather than premixing—mixes fuel and air at the point of ignition, producing a uniform, highly radiant flame.

WITH THE CONTINENTAL, you get a boiler which, before shipment, is test fired and adjusted for maximum performance. No special stack or foundation required.

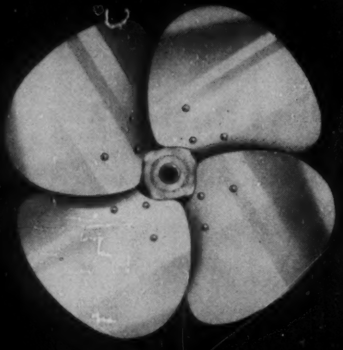
Continental Boilers, for high or low pressure, oil or gas fired—or combination thereof, range from 20 to 500 hp. Write for catalog 102.

CONTINENTAL is sold,
installed and serviced
by competent distributors
throughout the U.S.

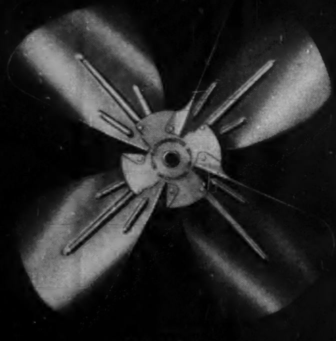
BE
BOILER ENGINEERING
AND SUPPLY COMPANY, INC.
8 Manavon Street • Phoenixville, Pa.
40 Years of Boiler Experience

TORRINGTON AIR IMPELLERS

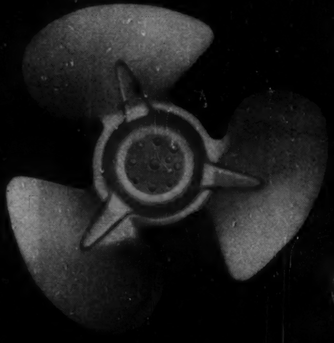
. . . FOR COOLING, HEATING AND VENTILATING EQUIPMENT



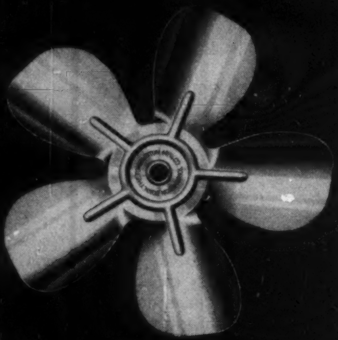
"E" SERIES



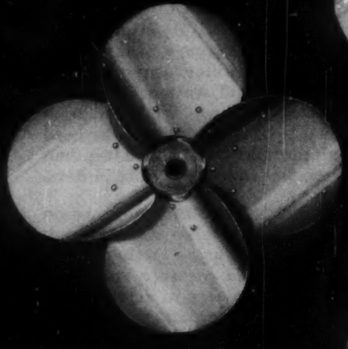
"M" SERIES



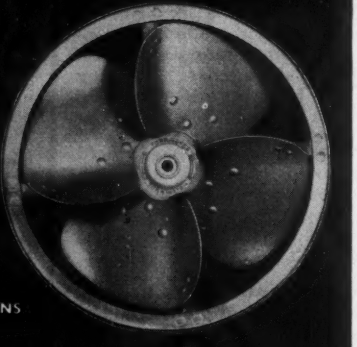
"LU" SERIES



ONE-PIECE AIRISTOCRAT



"S" SERIES



SLINGER RINGS
FOR ASSEMBLED FANS

During 20 years of specialization in the design and manufacture of fan blades and blower wheels, Torrington has accumulated a considerable amount of technical knowledge in this field. If you make air moving equipment, this experience is yours for the asking.

"E" Series Airistocrat Fan Blades. Outstandingly high efficiency lets this blade deliver more air for any given HP. Competitive tests showed up to 28% advantage for "E" Series over other blades.

Airistocrat "M" Series Attic Fan Blades give maximum cfm. per HP. Knockdown construction lowers shipping costs. Quiet operation. 40° pitch, 5 diameters.

"LU" Series. One-Piece Aluminum Fan Blades. Designed especially for refrigeration and air conditioning. Pierced for all unit-bearing motors. Hand-set for accuracy.

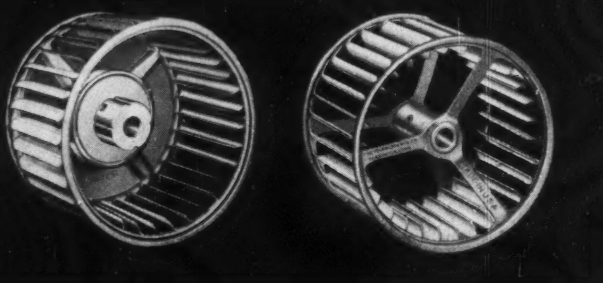
"One-Piece" Airistocrat Aluminum Fan Blades. Exceptionally rigid construction. 4-blade diameters: 3″ to 16″, 5-blade diameters: 5½″ to 10″. Available also in steel.

"S" Series. An all-purpose four blade propeller type fan. Quiet, sturdy, efficient. Aluminum blades, steel spider and hub.

"Slinger Rings" for assembled fans. Designed to adapt to all types of assembled Airistocrat blades in diameters of 10″, 11″ 12″, as condenser fans on room air conditioners.

Airotor Blower Wheels. 4-piece construction. No rivets, no welds. Machine balance for uniform production.

AIROTOR BLOWER WHEELS

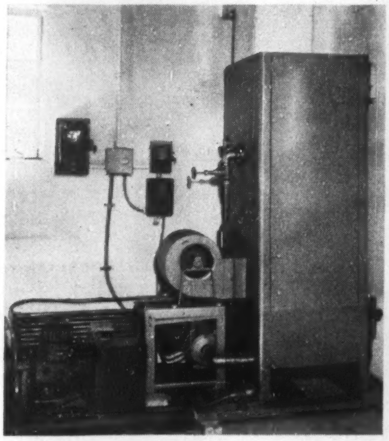


THE
TORRINGTON
MANUFACTURING COMPANY
TORRINGTON, CONNECTICUT
WEST COAST DIVISION: VAN NUYS, CALIF. • IN CANADA: OAKVILLE, ONT.

COMPACT COOLING TOWERS OF GROWING IMPORTANCE IN RESIDENTIAL COOLING

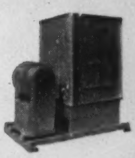
Market surveys reveal that the sale of room air conditioners for homes has increased by 600% since 1947. In 1952, total sales of both cabinet and window types for homes was 251,000 units. Substantial gains were registered in 1952 and the 1953 figures are expected to surpass 500,000 units. It is expected that the trend will swing to built-in central cooling system. Residential air conditioning, which originally "caught on" in volume in the Southwest is rapidly moving North and East in popularity...and promises to be an even bigger market in 1954.

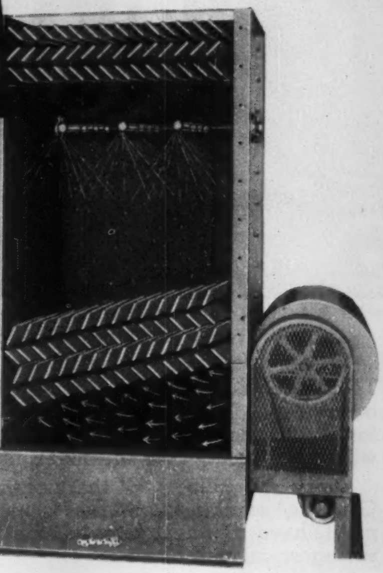
To meet the need for adequate cooling towers for "built-in" residential air conditioning installations, the Binks Manufacturing Co. has introduced an *extra quiet* unit which can be located in the basement, garage or yard. This compact cooling tower is Model B-23-B. It is designed specifically for home use, is furnished complete with a small circulating pump. It is blower driven by a single motor. This is suitable for loads from two to three tons commonly offered to the consumer market.



Full information on this specially-designed, moderately-priced unit may be obtained by writing direct to the manufacturer, Binks Manufacturing Company, 3118-38 Carroll Ave., Chicago, Ill. Ask for Bulletin 47-C. The new unit is now in production.

QUIET
Does Not Disturb!





Achieve maximum cooling WITHOUT NOISE!

Binks
SERIES 3-B
Cooling Tower

- Only dry air passes through the air propulsion assembly. This reduces corrosion and maintenance.
- Non-clogging ROTOJET nozzles produce maximum cooling. The whirl chamber causes fine fluid break-up.
- Air current moves up in opposite direction to downward water flow, thereby accelerating the cooling rate and volume.

For use indoors or out, a Binks *blower-type* cooling tower provides the cooling efficiency you want—*plus* easy, *low-cost maintenance*... and smooth, *silent*, dependable operation. A Binks type 3-B tower is *extra quiet* because its squirrel-cage blowers provide ample air movement while running at slow speeds.

Binks spray-deck construction steps up cooling efficiency by "filming" the water to expose more surface to the cooling air. This assures maximum heat transfer. *Controlled* air movement through the tower makes it independent of natural breeze.

You pay no more for this extra performance when compared with other equipment of similar size.

A COMPLETE LINE OF NATURAL DRAFT AND MECHANICAL DRAFT COOLING TOWERS AND INDUSTRIAL SPRAY NOZZLES

REPRESENTATIVES IN ALL PRINCIPAL CITIES • SEE YOUR CLASSIFIED ☎ DIRECTORY

SEND TODAY for these bulletins:
No. 47-A—Type 2-B (3 to 30 tons);
No. 47-B—Type 3-B (1 to 108 tons);
No. 47-C—Type B-23-B (2 to 3 tons).

Binks
EVERYTHING FOR WATER COOLING

MAIL COUPON TODAY!

Binks Manufacturing Company,
3118-38 Carroll Ave., Chicago 12, Ill.

Gentlemen: Please rush FREE Cooling Tower Bulletins as checked:

☐ Bulletin 47-A ☐ Bulletin 47-B ☐ Bulletin 47-C

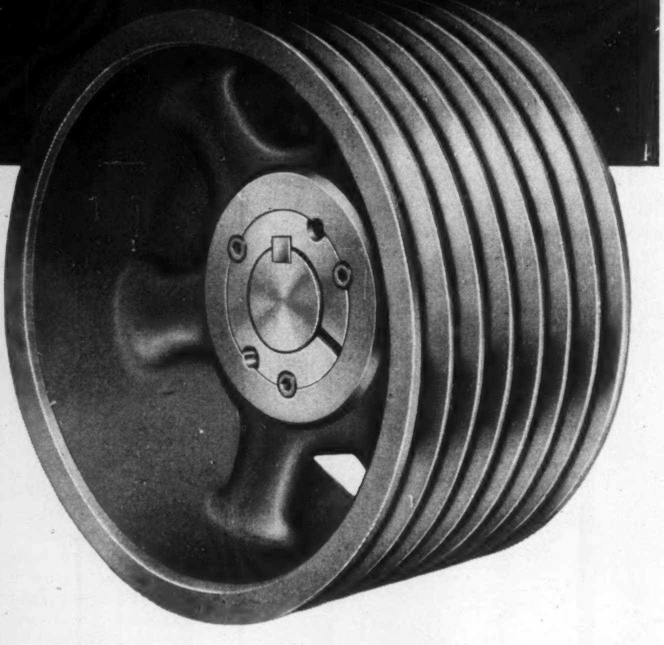
NAME____________________

COMPANY____________________

ADDRESS____________________

CITY__________ZONE______STATE______

There's only ONE TAPER-LOCK



TAPER-LOCK sheaves run true! The patented Taper-Lock bushing grips the shaft for the full length of the bushing—holds with the firmness of a shrunk-on fit!

Every belt pulls its full share of the load. Grooves, machined on precision equipment, have identical pitch diameters, assuring equal belt tension.

Easy on—Easy off. Slip it on the shaft, line it up and tighten while sighting. In ease and speed of mounting and demounting you'll appreciate there is only ONE Taper-Lock.

No flange, no collar, no protruding parts. Flush hub means safety.

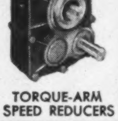
Taper-Lock sheaves are available from distributors' stocks in complete range of sizes in A, B, C and D grooves.

DODGE MANUFACTURING CORPORATION
1600 UNION STREET, MISHAWAKA, INDIANA

DODGE
of Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory-trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone book.

DODGE-TIMKEN PILLOW BLOCKS



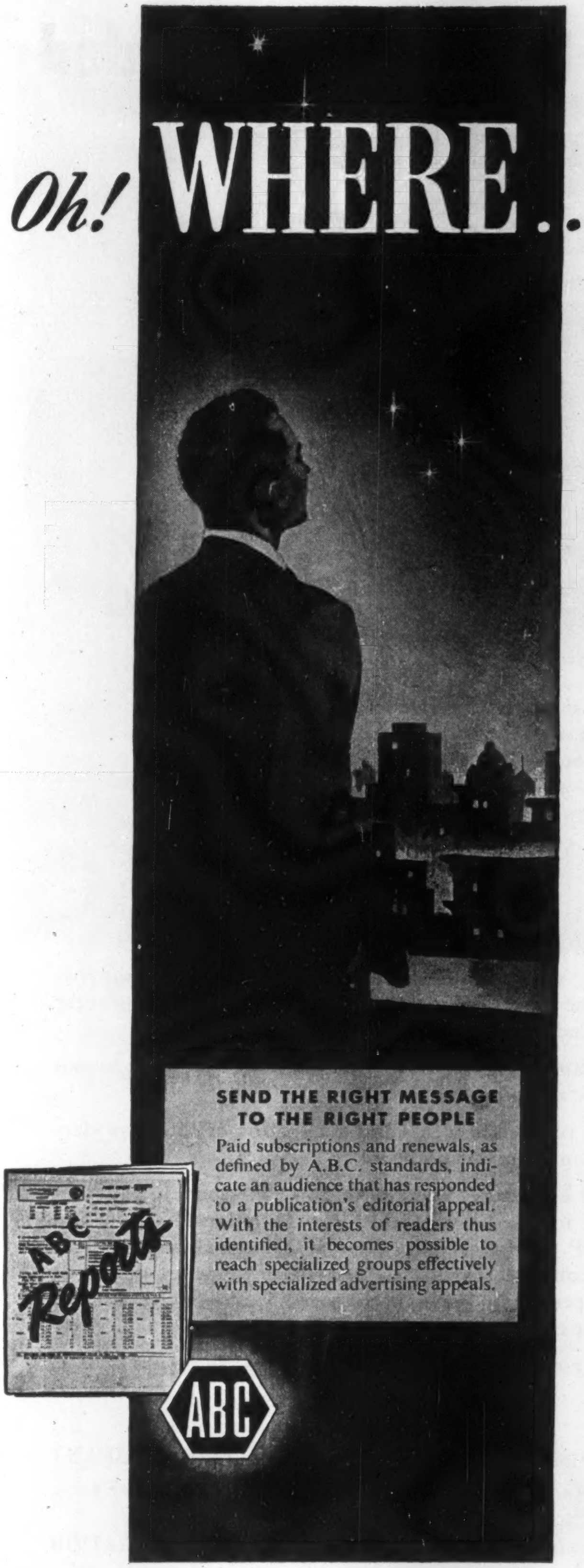
TORQUE-ARM SPEED REDUCERS

ROLLING GRIP AND DIAMOND D FRICTION CLUTCHES

NAME PLATES

FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY, CHICAGO THRIFT-ETCHING CORPORATION, 1555 N. SHEFFIELD AVENUE, CHICAGO 22, ILLINOIS

Oh! WHERE *. . . is my wandering ad tonight?*



SEND THE RIGHT MESSAGE TO THE RIGHT PEOPLE

Paid subscriptions and renewals, as defined by A.B.C. standards, indicate an audience that has responded to a publication's editorial appeal. With the interests of readers thus identified, it becomes possible to reach specialized groups effectively with specialized advertising appeals.

THERE are two ways to buy advertising space. One is the guesswork-opinion method. The caption above is the mournful song of an advertiser who is still selecting media the way it was done before World War I, when there were no standards for the circulations of published media and when there was no accepted and approved method of auditing circulations. In those days, advertisers O.K.'d their proofs and sent out their advertising with a prayer that some of their sales messages would find their way to market.

The other way to buy space is the factual, know-what-you-get-for-your-money method. Today advertisers can start their investments on a basis of facts by selecting media with the help of the information in the reports issued by the AUDIT BUREAU OF CIRCULATIONS. This cooperative and nonprofit association of 3300 advertisers, advertising agencies and publishers, organized in 1914, has established standards that make it possible to evaluate the circulations of published media. The A.B.C. maintains a large staff of experienced and specially trained circulation auditors who make annual audits of the circulations of publisher members. A.B.C. reports give the facts thus obtained.

Here are some of the audited facts about business papers that A.B.C. reports tell the advertiser:

—how much paid circulation;
—how much unpaid;
—an occupational or business breakdown of subscribers;
—where they are located;
—how much subscribers pay;
—whether or not premiums are used;
—how many subscribers are in arrears;
—what percentage of subscriptions are renewed.

Those who buy advertising on the basis of this factual information, as given in A.B.C. reports, do not have to speculate about the distribution of their sales messages. They KNOW where and to whom their advertising goes. That is why this business paper is a member of the AUDIT BUREAU OF CIRCULATIONS. Ask for a copy of our A.B.C. report and then study it.

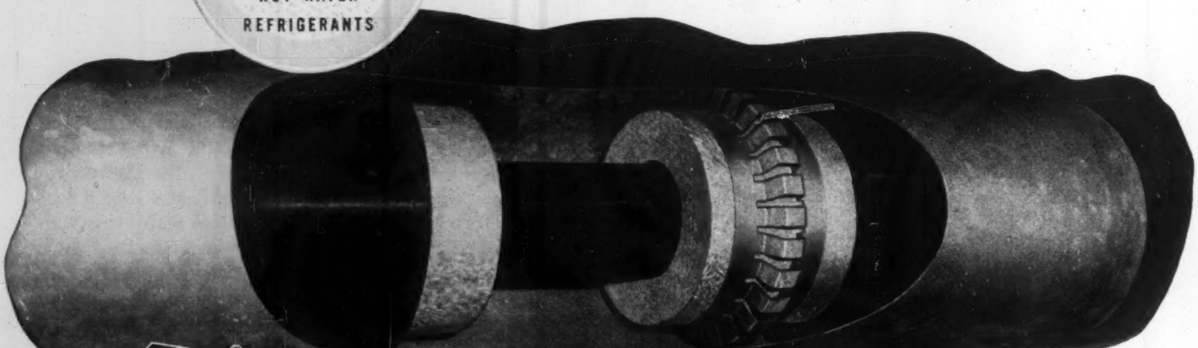
HEATING, PIPING
& AIR CONDITIONING

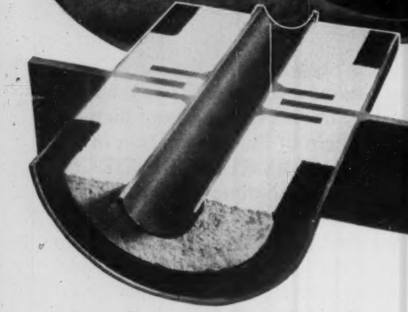
A.B.C. REPORTS—FACTS AS THE BASIC MEASURE OF ADVERTISING VALUE

D.I.P.®

FIRST IN THE
FIELD OF PRE-SEALED
INSULATED PIPING
FOR STEAM
HOT WATER
REFRIGERANTS

Only DURANT Pre-sealed Insulated Pipe gives you these features:





Durant Patented Insulated Anchor

- D. I. P. is the only pre-sealed insulated conduit that does not depend on a metal jacket for protection from moisture, leakage and corrosion. A 1″ layer of high-melting-point, non-porous asphalt is the waterproofing protection.

This means: deterioration of the metal casing underground is of no concern. Years of service and even complete submersion do not harm D. I. P.

- By design, Durant's Patented Supporting Ring allows asphalt to flow through openings during fabrication to *encase* the ring.

This means: water or moisture cannot pass through support points to the insulation or pipe. It means efficient insulating properties and extreme durability.

- Durant's Patented Insulated Anchor eliminates contact between anchor plate and pipe.

This means: reduced heat loss and elimination of corrosive electrolytic action at anchor points.

Many other advantages come with D. I. P.—such as low cost installation, for the Durant field joint can be made swiftly and easily. D. I. P. does not require external casing-welding: nor does it require concrete tunnels, slabs, rollers, supports, drains or additional protection for superimposed loads—such as under roadways or railroad tracks.

Durant's engineering staff and representatives are at your service.

• • •

— JUST OFF THE PRESS —

A new 54 page catalog. A complete description of D.I.P. Insulated conduit together with general and practical information on underground insulated piping systems.

Write for Catalog D-35.

Representatives in Principal Cities

PRE SEALED®

Western Division: **DURANT INSULATED PIPE COMPANY**
WARREN WAY AND BAY ROAD, PALO ALTO, CALIFORNIA

Eastern Division: **DURANT INTERNATIONAL CORPORATION**
WILLIAMSTOWN, NEW JERSEY

Ilg's new
LC-8
ILG

Quicker exhaust
Quieter operation
. . . FOR EVERY KITCHEN

ILG®
KITCHEN VENTILATORS

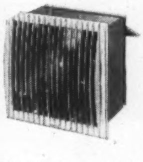
NEW LOW PRICE! Now even the most economy-minded building budget can include a famous-for-quality ILG Kitchen Ventilator—your best buy for kitchen exhaust.

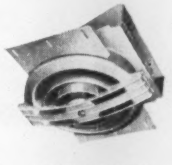
CERTIFIED CAPACITY . . . under standard industry testing codes. Special blade design plus more than adequate horsepower *moves more air*.

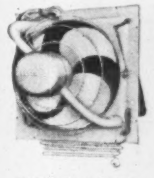
WHISPER-QUIET OPERATION! You hardly know it's on . . . no annoying whine, screech or roar . . . just smooth, even, *extremely* silent operation.

FAMOUS ILG QUALITY! ILG's famous one-name-plate guarantee covers the *complete unit* . . . your assurance of many years of carefree service.

ILG ELECTRIC VENTILATING CO.
2850 North Pulaski Road, Chicago 41, Illinois


AUTOMATIC BUILT-IN ILGETTE


CEILING ILGETTE


PACKAGE ILGETTE

The Leaders!

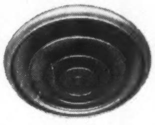
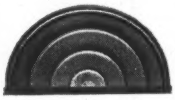
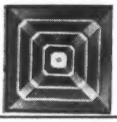
in style, quality and economy

AIR DISTRIBUTION

CARNES

A DIFFUSER FOR EVERY REQUIREMENT

Yes, Carnes leads with a line of diffusers that's way ahead! *You've told us* what you wanted . . . and we have incorporated all the *best* ideas, all the *newest* developments that engineers and architects demand. Beautiful styling, easy installation, and complete adjustability for all air patterns, plus quiet operation. And remember . . . Carnes is *top quality* at *low price* that will save you real money! Your best bet *is Carnes!*

MODEL		NECK SIZES	C F M OUTPUT	DESCRIPTION	
E-1	Supply only fixed cone	5 to 32	50 to 13,400	A flush mounting diffuser designed primarily for exposed duct applications or where obstructions make recessed mounting impossible. The set pattern is for horizontal throw.	
E **EJ** **ER**	Supply only fixed cone Supply only adjustable cone Supply and return fixed cone	5 to 32	50 to 13,400	This expanded cone diffuser is constructed with the same number of cones in all styles or sizes giving a uniform appearance when various styles or sizes are used in the same area. The fixed cone model "E" can be set for vertical or horizontal pattern.	
BR **BRS**	Supply only adjustable cones Supply and return adjustable cones	6 to 32	115 to 13,400	A beautifully styled multicone diffuser featuring easy installation and simple adjustment for various air patterns desired. Available with a full line of accessories to make balancing the system a simple matter.	
EH	Half Round supply only fixed cone	6 to 20	50 to 2,725	The model EH is styled along the identical lines of the other series E models. A unique feature of this diffuser is that the inner vane assembly can be set for either horizontal or vertical air pattern which makes it adaptable for either ceiling or sidewall installations.	
QSL	Combination diffuser and lighting fixture adjustable	8 to 17	210 to 2,670	The model QSL combination diffuser and light is designed to harmonize in appearance with either the model E series or the BR and BRS. The cone assembly can be set for any of three positions for horizontal, vertical or intermediate air patterns.	
SFS **SFR**	Supply only surface type fixed cone Supply only recessed type fixed cone	8 x 8 to 20 x 20	150 to 6,925	These square and rectangular diffusers with the corner air scoops give a full 360° air pattern, thus giving round diffuser performance from a square or rectangular unit. Available in both recessed and flush mountings and with a full set of accessories.	

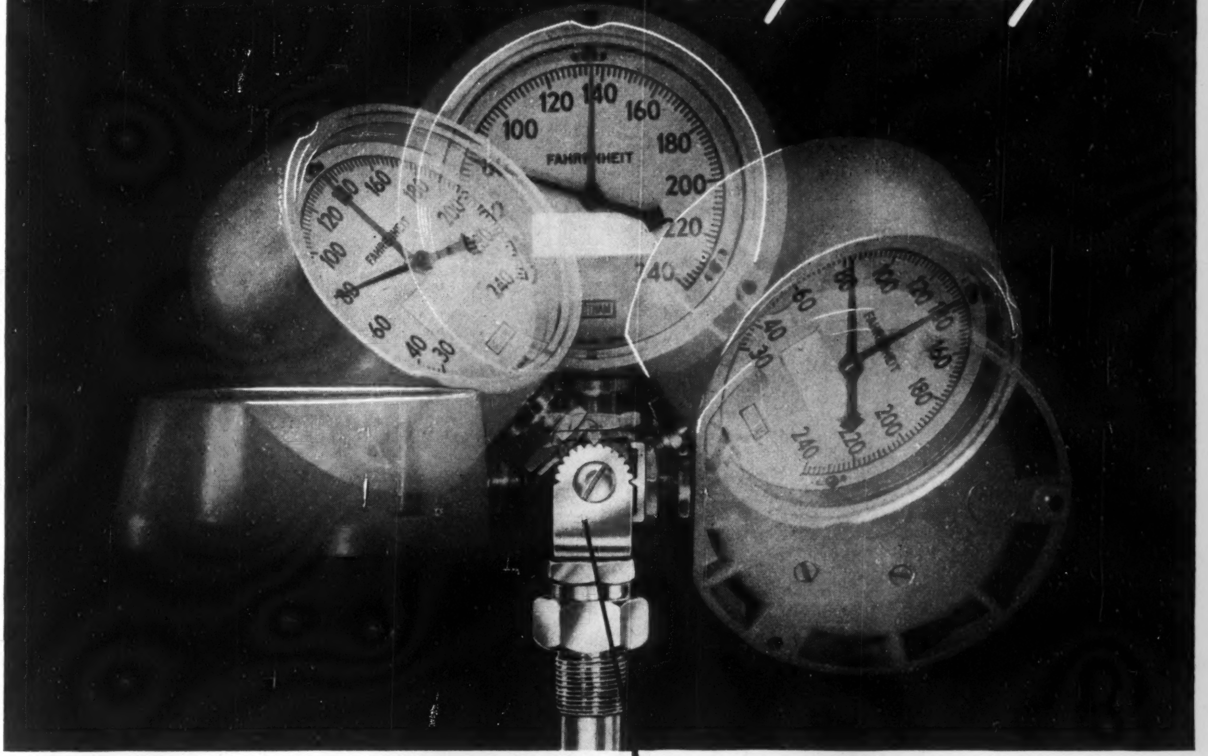
Write today for Carnes descriptive literature, selection charts and engineering data!

CARNES

The Most Talked About Name in Air Distribution

W. R. CARNES CO., VERONA, WISCONSIN

Any way you look at it this Thermometer is *Easy Reading*



You've been asking for a dial thermometer like this—A thermometer that can be positioned and firmly locked at any practical angle—now you can have it!

No stretching or straining to see this thermometer. Easy to adjust to required new positions before or after installation. No risk of the multi-angle selector working loose. A specially designed selector assures positive locking at every practical mounting angle and a few turns of *one* nut lock the selector securely.

These instruments, supplementing USG's complete line of Gotham temperature indicators, are designed to fit all standard connections and are available in all standard ranges. If you have a number of applications requiring "odd angle" mounting these new multi-angle thermometers will reduce the number and variety of instruments you have to carry in stock.

Before you order an angle thermometer be sure you see USG's new Gotham Multi-Angle Thermometer.

UNITED STATES GAUGE

ADVANTAGES

1. Positive locking in every conceivable angle.
2. Reduces the number and variety of instruments required in your maintenance stock.
3. Provides that extra "odd angle" instrument which normal stock does not furnish.
4. Easy to change to any desired angle, before or after installation.
5. Saves engineers time when writing specifications.
6. Affords easy reading at odd angles.

Dept. 8
United States Gauge
Division of American Machine and Metals, Inc.
Sellersville, Pa.

Gentlemen:

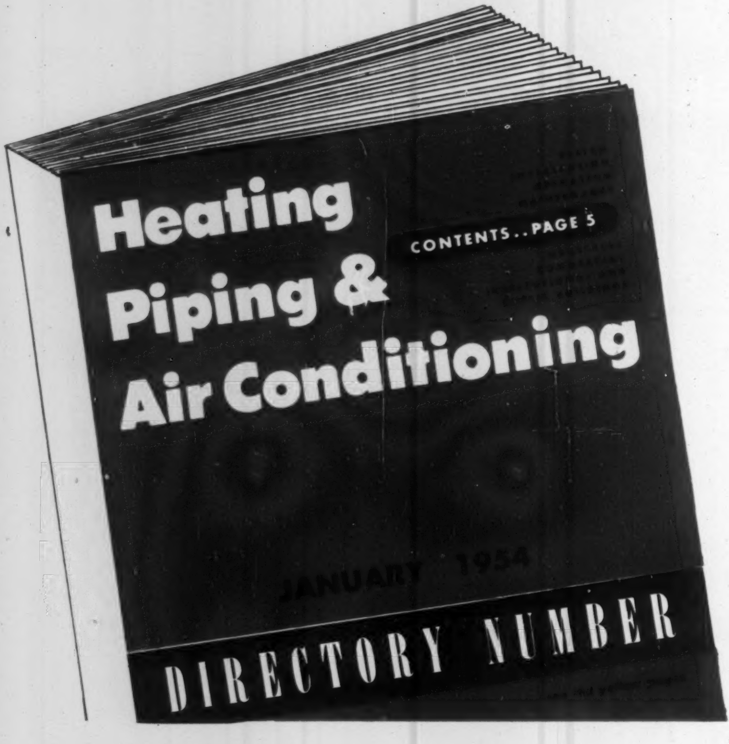
We'd like to know more about the new USG Multi-angle Thermometer. Please get in touch with us.

Name________________ Title________________

Company________________________________

Address________________________________

City____________ Zone______ State__________



- PRODUCTS CLASSIFIED
- TRADE NAMES
- MANUFACTURERS' ADDRESSES

HERE IS YOUR SOURCE

of Complete Product Information

. . . Are You Finding It Useful?

If you are like the average subscriber, you will have near at hand—and frequently use—this January Directory Number of HPAC . . . . the field's complete reference guide to the products which engineers and contractors specify and purchase for the heating, piping and air conditioning work they handle.

Each January you get a new, up-to-date HP&AC Directory Edition. It's a part of your annual subscription to our publication.

Have you any suggestions for making these editions *more* valuable? . . . . suggestions which we as publishers might adopt, or which we can pass along to the many manufacturers who co-operate with us by furnishing complete data on their products in each January Edition?

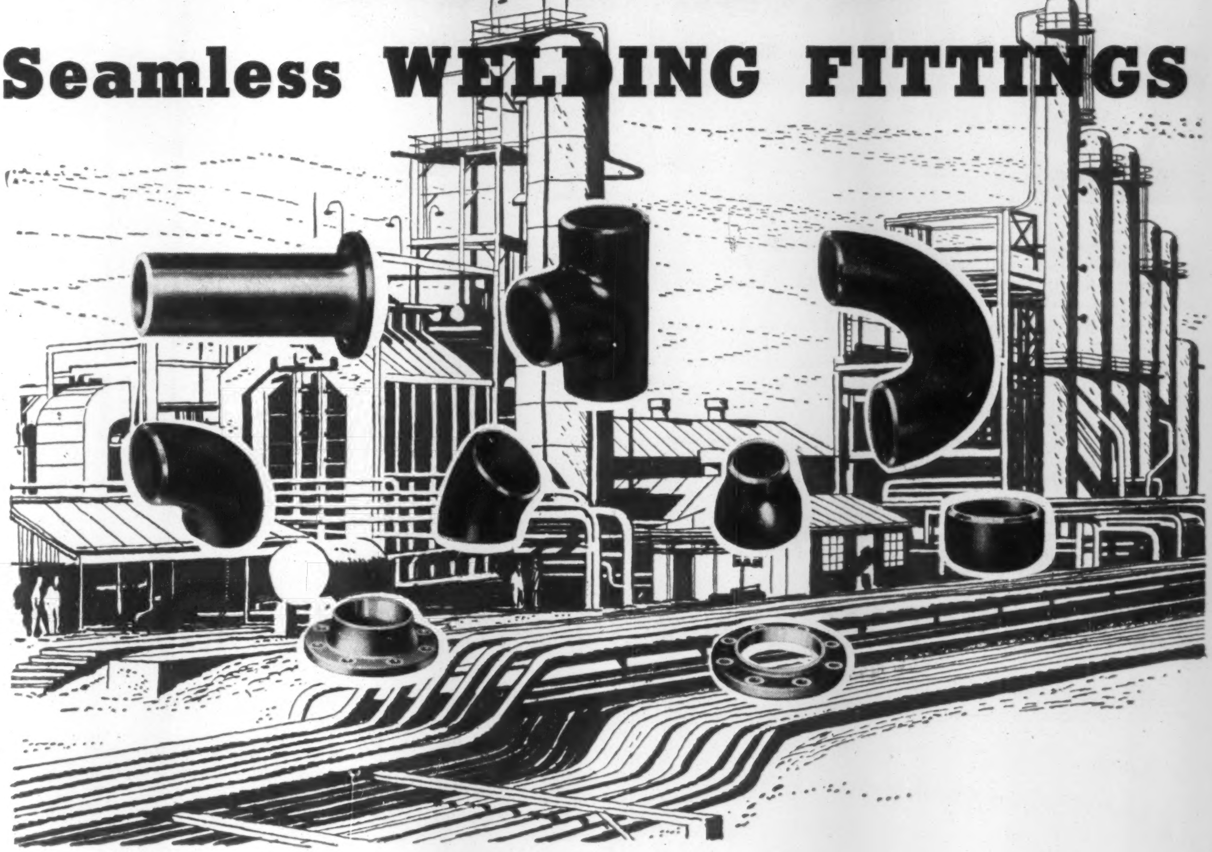
Your comments are sincerely welcomed.

Over 90% of those HP&AC subscribers, answering a survey, stated that they found the January Directory Edition helpful in their work.

FIRST *in Editorial . . . in Circulation . . . in Advertising*

GLOBE

Seamless WELDING FITTINGS



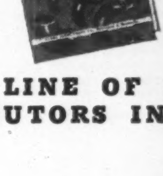
The only seamless welding fittings precision-processed . . . from billet . . . to tube . . . to fitting

From charging the specially designed revolving furnace with a steel billet (above) through the many succeeding steps of production, every Globe process is specialized to produce fittings of unvarying quality.

Globe precision-process manufacture begins with the billet—continues through the making of the seamless steel tube (Globe alone among welding fittings manufacturers produces seamless steel tubes)—and extends through to the production of the finished fittings.

Because Globe has highly specialized controls—at every stage of manufacture at its own plant—you can be sure of uniform high quality seamless welding fittings when you specify Globe.

Send for the Globe Welding Fittings complete catalog.



GLOBE STEEL TUBES CO.,
Milwaukee 46, Wisconsin

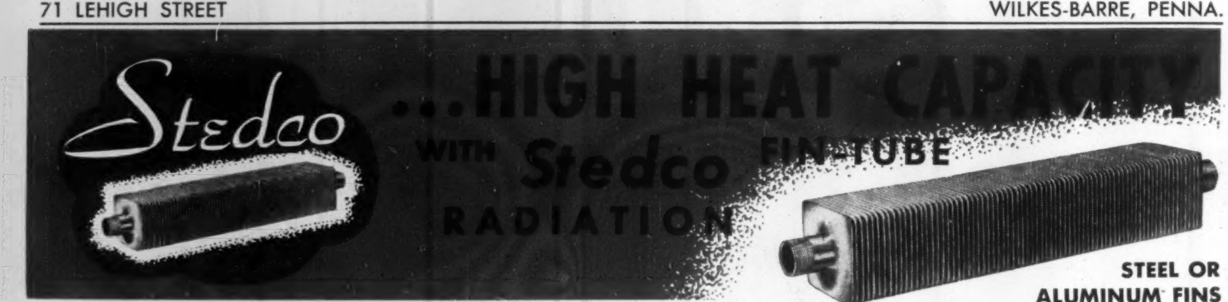
Chicago • Cleveland • Detroit • New York • Philadelphia • St. Louis • Denver • Houston • San Francisco
Glendale, Cal.

Producers of Globe Welding Fittings — Globe seamless stainless steel tubes — alloy-carbon seamless steel tubes — Gloweld welded stainless steel tubes — Globeiron (high purity ingot iron) seamless tubes.

AVAILABLE IN A COMPLETE LINE OF SIZES AND WEIGHTS THROUGH GLOBE DISTRIBUTORS IN ALL KEY CITIES

STEDCO PRODUCTS

71 LEHIGH STREET — WILKES-BARRE, PENNA.



STEEL OR ALUMINUM FINS

Stedco radiation is perfect for industrial and commercial heating applications. This same radiation element is standard on all Stedco compact convectors. Stedco radiation is made of 1¼″ seamless steel tubing with #22 gauge fins of steel or aluminum. Fins attach mechanically eliminating use of a solder bond for better heat transfer.

Stedco fins interlock in sleeve fashion and completely encase center tube. With aluminum fins this provides a non-corrosive heating element. Stedco construction gives double the contact area between fin and tube for more heat output, assuring greater heating capacity throughout life of element.

The single pipe feature of the STEDCO radiation permits high, safe working pressures up to 150 lbs. adaptable to 2 pipe heating systems. STEDCO units function as well with sub-atmospheric steam as with steam under pressure and provide an unusually high degree of fuel economy and temperature control. Stedco radiation is manufactured in standard sizes, in foot and half-foot lengths up to twelve feet. Standard units are threaded at each end with standard pipe threads unless otherwise ordered. No end fittings or grilles are furnished with radiation but are available for all lengths.

BTU OUTPUT OF STEDCO CONVECTORS

TYPE OF CONVECTOR	Ent. Air	Rad. Ft.	Water 180°F	1 Lb. Steam Standard 215°F	Sq. Ft. EDR
Steel on Steel—with Cabinet	65°	1	1238	1848	7.7
Steel on Steel—Element only	70°	1	1159	1680	7
Aluminum on Steel—with Cabinet	65°	1	1415	2112	8.8
Aluminum on Steel—Element only	70°	1	1325	1920	8

The Stedco Radiation Element has been tested by a nationally known university and the ratings quoted are based on tested engineering data supplied by the university.* Engineering data ratings are based on the standard conditions of 1 lb. steam pressure, 215° steam temperature and 70° room temperature. One lineal foot of STEDCO radiation with steel fins will give 1676 BTU or 7 square feet of EDR per hour. One lineal foot of STEDCO radiation with aluminum fins will give 1930 BTU or 8 square feet of EDR per hour.

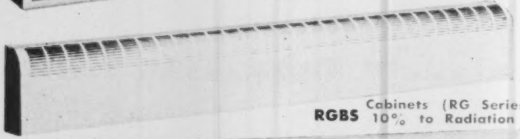
**University testing laboratory furnished on request.*

STEDCO COMPACT CONVECTORS

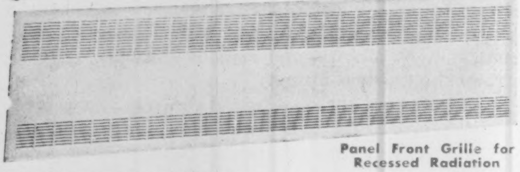
For COMMERCIAL-INDUSTRIAL and RESIDENTIAL INSTALLATIONS - - -

INDUSTRIAL EXPANDED METAL COVER

RGBG



RGBS Cabinets (RG Series) add 10% to Radiation output



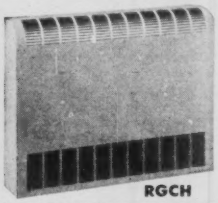
Panel Front Grille for Recessed Radiation

ALL CONVECTORS FURNISHED IN STANDARD LENGTHS — LIGHT PRIME FINISH.

A STEDCO INSTALLATION

U. S. Veteran's Hospital
Wilkes-Barre, Pa.

Stedco radiation was the choice for this hospital where economical, dependable heating is a prime requisite. Stedco met and passed the rigid specifications and requirements.



RGCH

CONVECTORS
STEDCO CABINET HEIGHT

The Stedco RGCH (Round Grille Cabinet Height) convector is manufactured in 20″ height for *double tiering* and 30″ height for *triple tiering only*. Type RGCH is 4½″ wide and is available in standard lengths. Where limited space and radiation output is a problem, let the RGCH convector solve it easily and efficiently.

- **STEDCO GIVES MORE HEAT**

  The high heating capacity of Stedco convector elements means ample capacity for any sized room: fewer feet of radiation required.

- **STEDCO CONSUMES LESS SPACE**

  Only 10¾″ high and 4½″ wide, Stedco is inconspicuous and does not interfere with room or furniture arrangement.

- **STEDCO COSTS LESS TO INSTALL**

  Stedco high heat capacity means less radiation is required, fewer valves and fittings required. Stedco needs no recessing takes less labor to install, keeps installation costs down.

- **STEDCO MODERN DESIGN COMPACT CONVECTORS**

  Available in several models of compact convector covers or grilles to meet any decorative or architectural design. All Stedco compact convectors use the standard Stedco fin tube radiation element allowing a choice of convector covers on one heating system.

- **STEDCO FOR NEW CONSTRUCTION OR REMODELING**

  Gives the maximum in satisfaction, a wide choice of designs for new construction and the perfect answer for replacing outmoded radiation in remodeling present heating systems.

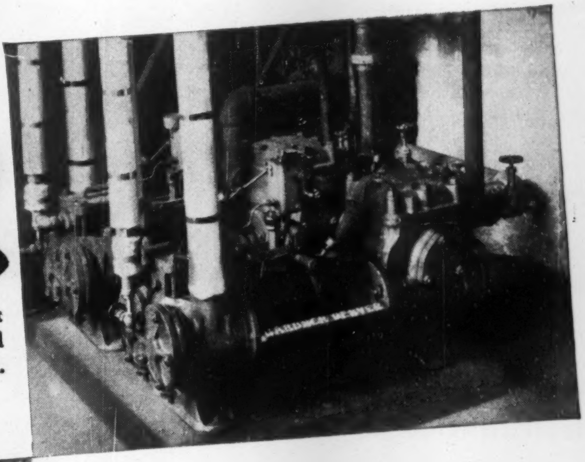
- **STEDCO ALLOWS MAXIMUM AIR CIRCULATION**

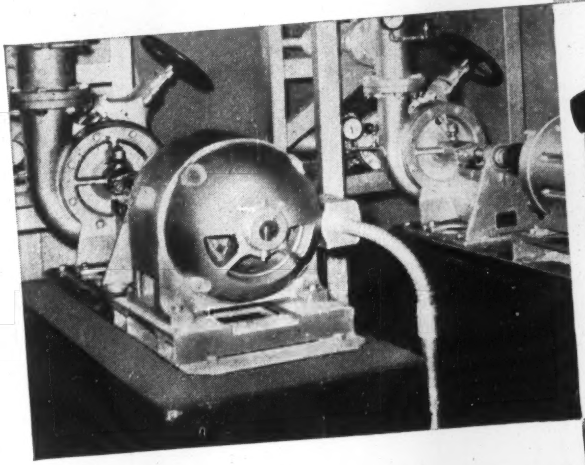
  Will not smudge walls or furnishings.

WRITE FOR COMPLETE ILLUSTRATED DATA.

POWER

Installed in a New Orleans plant in 1907, a Gardner-Denver Duplex Pump like this is still in use—is still called the best pump in the mill.



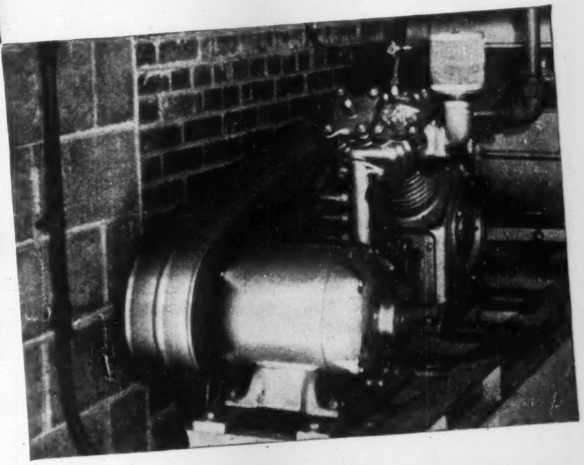


ROOM

A midwest water works reports it has operated a Gardner-Denver Centrifugal Pump for 17 years, with no repairs.

TALK

In a Canadian laundry, a Gardner-Denver Air-Cooled Compressor has run for 8 years steady—without even having the valves cleaned.



TELLS THE STORY OF...

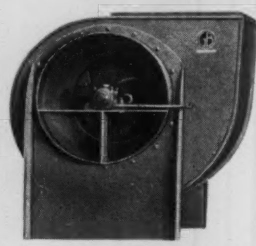
CUSTOMER SATISFACTION WITH GARDNER-DENVER EQUIPMENT

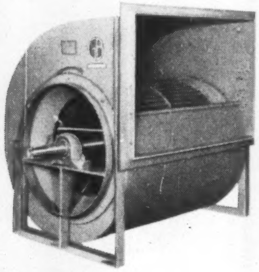
Send for descriptive bulletins.

SINCE 1859 GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd.,
14 Curity Ave., Toronto 13, Ontario

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS
FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY





GENERAL

Strong Dependable

AIR MOVERS *for*

Institutions — Hospitals — Schools

CENTRIFUGAL FANS BB

This unit is a non-overloading type with a backward blade wheel that can be directly connected to motors of standard speeds. Although operating at higher speeds, the design of the wheel enables the delivery of large volumes of air with minimum noise and vibration.

BELT DRIVEN MULTI-VENT SETS

are available with both forward curve and backward blade type wheels recommended for their wide range, low cost handling of a variety of ventilating and industrial applications requiring low and medium ranges of air capacities at quiet, efficient operation. Direct connected units available for low volumes with wheel sizes 4″ to 12″.

ROOF VENTILATORS — BB

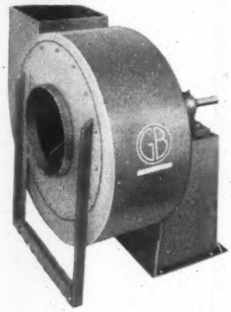
The new General power roof ventilator has an exceptionally low silhouette and in the design incorporates the non-overloading backward blade type wheel. This unit gives a wide range of performance with aerodynamic design.

CENTRIFUGAL FANS FC

slow speed units offer exceptional quietness in operation. For larger volumes required in the fields of heating, ventilating, air conditioning, recirculation of furnace air for Industrial ovens, dehydrating equipment and agricultural crop drying processes.

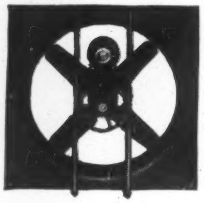
STEEL PLATE EXHAUSTERS

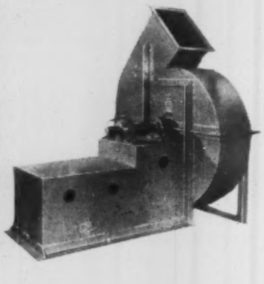
are material handling exhausters to convey air — borne particles caused by grinding, polishing, buffing, plating, dusting, sawing, planing, sanding and screening operations. Also available for high temperature air recirculation and may be fabricated of special alloy steels.



PROPELLER FANS —

are supplied with both cast aluminum and steel blades that are available in sizes 10″ to 72″. These units are available with single or two-speed motors, and a complete line of automatic shutters are also available.





HIGH DUTY PRESSURE FANS

General High-duty pressure fans are recognized by engineers and contractors for meeting medium and large volume requirements at high velocities for cupolas, blast furnaces, crucibles and small cupolas.

LUNGS for INDUSTRY
Write for it

"LUNGS FOR INDUSTRY"

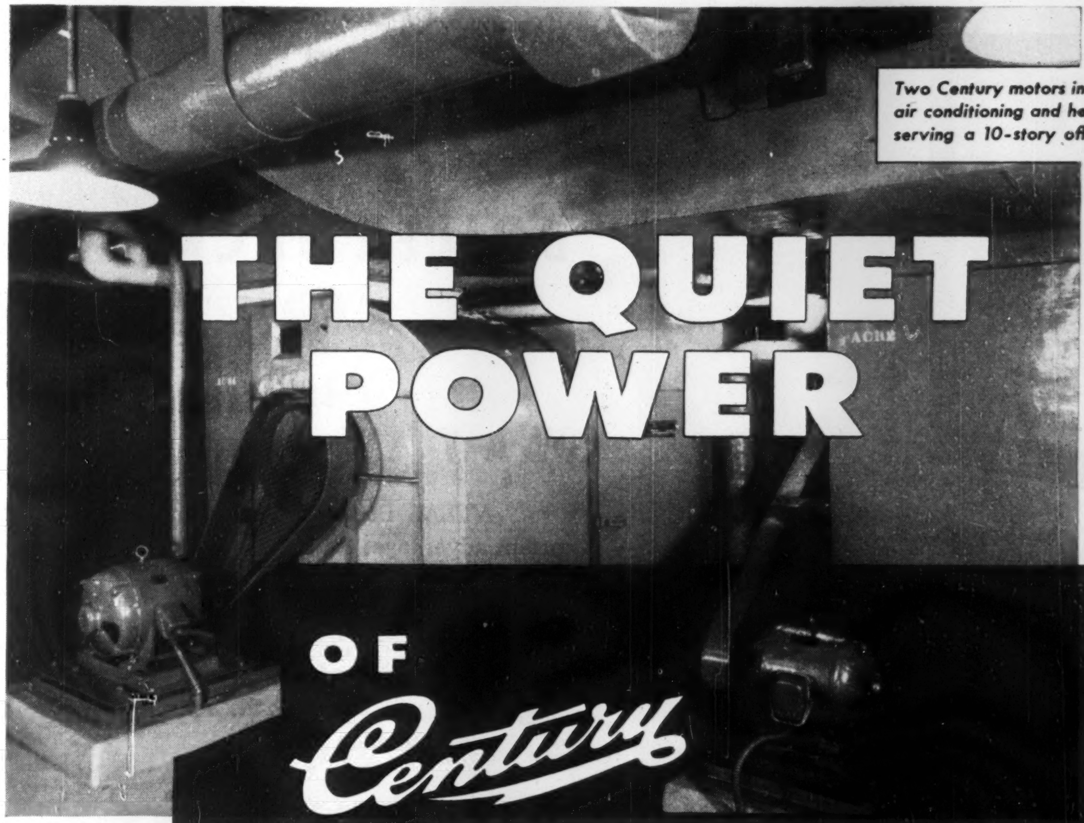
DESIGNERS
&
ENGINEERS

GB

Manufacturers
FANS
BLOWERS
EXHAUSTERS

GENERAL BLOWER COMPANY 8610 Ferris Street
Morton Grove, Illinois

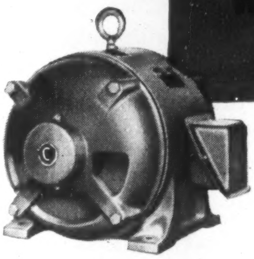
SALES OFFICES IN PRINCIPAL CITIES ALL OVER U.S.A.


Two Century motors installed on an air conditioning and heating system serving a 10-story office building.

THE QUIET POWER

OF Century MOTORS

WILL HELP KEEP YOUR CUSTOMERS HAPPY



792

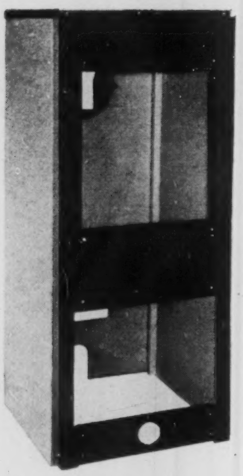
To assure quiet starting and efficient, dependable operation manufacturers do two things. They engineer their equipment skillfully *and* they choose motors carefully to bring out the best performance in their equipment.

Many leading manufacturers of heating, ventilating and air conditioning equipment depend on Century motors. They have found that Century's wide range of motor sizes and types helps them select motors that are exactly right for every job.

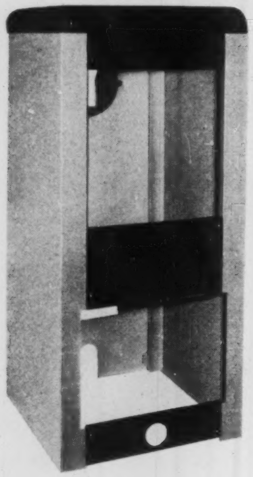
Century motor-power on the equipment you install is your first step toward complete customer satisfaction. Remember, Century's nationwide network of Branch Offices and Authorized Distributors is always at your service to help you with your motor problems.

400 TO 1/8 HORSEPOWER

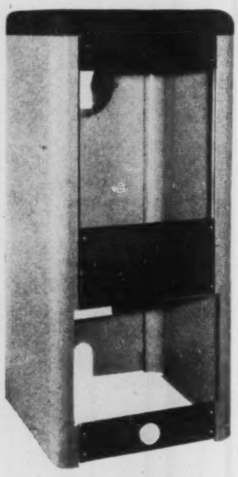
CENTURY ELECTRIC COMPANY
1806 Pine Street, St. Louis 3, Missouri
Offices and Stock Points in Principal Cities



ECONOMY



QUALITY



DE LUXE

atlas

BOILER JACKETS

3

WAY WINNERS

ATLAS Boiler Jackets offer three important advantages to the manufacturer:

1 ATLAS special construction and low prices will reduce costs.

2 They will enhance the appearance of your product.

3 Improved product appearance will improve your sales.

ATLAS boiler jackets are custom-built to manufacturers' dimensional specifications. Jackets are of heavy gauge steel, with baked enamel finish and ready to install. No tooling costs are necessary on the three basic styles illustrated. ATLAS flush type boiler jackets are available in three types of construction.

Choose "ECONOMY" square-cornered jackets for cost saving, "QUALITY" with round cornered top for competitive pricing plus appearance, or "DE-LUXE" with fully round corners for your select dealer trade. You'll find any of the three the ultimate in appearance and value.

ATLAS also manufactures cabinets for heating, cooling and air conditioning units. For cost estimates, send specifications and requirements to:

Atlas

MANUFACTURING COMPANY

EUSTIS AT ROBBINS ST. • ST. PAUL, MINN.

W. PARKE JOHNSON

"*. . . opportunity is freely given . . .*"

PAUL M. HAHN
President, The American Tobacco Co.

"Our nation has grown great largely because opportunity is freely given. Only very few people actually make their own 'breaks.' Today, millions of Americans are providing for their personal financial security and at the same time helping in the building of our national defenses. The opportunity to do so is given by business management which affords employees the means of practicing systematic thrift through the Payroll Savings Plan for the purchase of U.S. Defense Bonds."

Nearly seven million employees of industry are "providing for their personal security and at the same time helping in the building of our national defenses."

- they are the men and women who availed themselves of the opportunity referred to by Mr. Hahn—the opportunity to enroll in the Payroll Savings Plan for the systematic purchase of U.S. Defense Bonds.
- they represent a high percentage of their companies' employees—in plant after plant, the averages are climbing to 60%, 70%, 80%—even higher.
- their investment in Defense Bonds—and America—add up to $140 million per month.
- they constitute a large block of the men and women who on December 31, 1951, held Series E Bonds amounting to $34,727,000,000—$4.8 billions more than the cash value of Series E's outstanding in August, 1945.

Not far from you is a State Director of the Savings Bond Division. He will be glad to tell you how easy it is to give your employees a Payroll Savings Plan. Or, if you already offer the Plan to your people, he will show you how to conduct a simple person-to-person canvass of your plant—a canvass intended to do only one thing—to put a Payroll Savings Application Blank in the hands of every man and woman on your payroll. Your employees will do the rest.

Phone or write to Savings Bond Division, U.S. Treasury Department, Suite 700, Washington Building, Washington, D. C.

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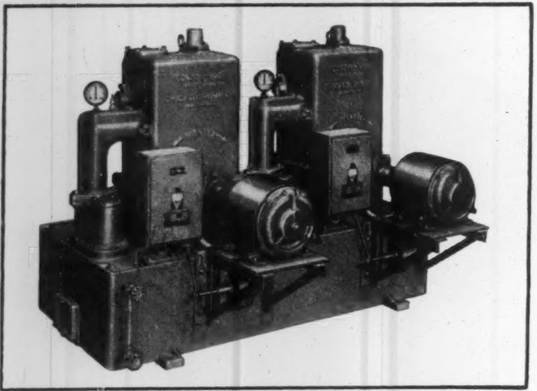
Heating, Piping and Air Conditioning

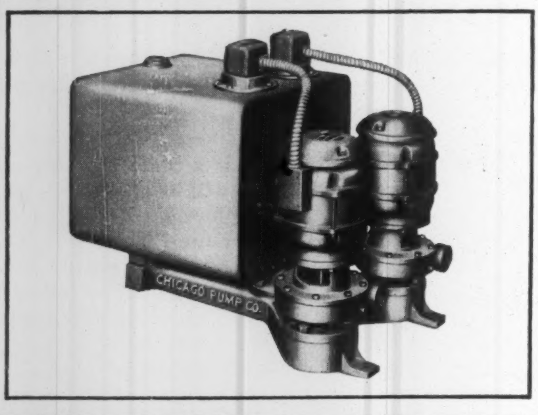
Chicago
PUMPS

ARE BETTER PUMPS FOR EVERY BUILDING SERVICE



DUPLEX CONDO-VAC RETURN LINE VACUUM AND BOILER FEED PUMP

Specifically designed for vacuum heating systems. The water capacity of the Condo-Vac remains constant up to the boiling point. The air capacity remains constant to the evaporation point. Pressures up to 40 lbs. Capacities from 2500 to 150,000 EDR. Described in Bulletin 270.



SURE RETURN CONDENSATION PUMP & RECEIVER

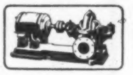
For systems up to 75,000 EDR and for low and medium pressures. Available in either single or duplex units. The base serves as a large capacity manifold through which the condensate flows by gravity from the receiver to the pump. The Sure Return will not steam bind. Described in Bulletin 250.

CHICAGO PUMP COMPANY

BUILDING and INDUSTRIAL DIVISION

622 DIVERSEY PARKWAY

Condo-Vac, Sure Return. AVC, LVC,
Fire, House & Circulating Pumps
Pneumatic & Tankless Water Systems.



CHICAGO 14, ILLINOIS

Flush-Kleen Sewage Ejectors
Little Giant & Non-Clog Bilge Pumps
Pumps for every industrial use.

HEATING PUMPS

For every heating system get the pump that is specifically designed for the particular job. For below floor returns, for low vacuum systems, for small capacity high pressure requirements, for any standard heating system, or any unusual condition, there is a CHICAGO Heating Pump that will do the job better. All ratings and receiver capacities meet or exceed ASHVE standards.

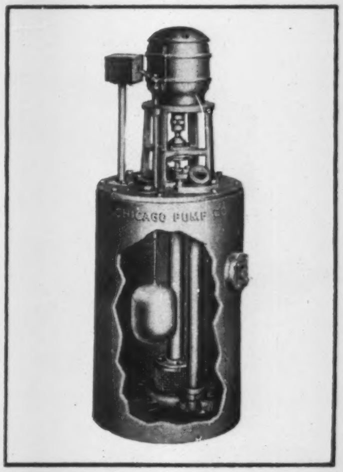
TYPE AVC CONDENSATION PUMP & RECEIVER

Heavy cast iron receiver with low inlet for floor mounting or shallow pit. Sets on floor—no foundation bolts necessary. Weight of unit and piping hold unit firmly in place. For 500 to 10,000 EDR and 10 to 30 lbs. pressure. See Bulletin 245.

CHICAGO PUMP CO

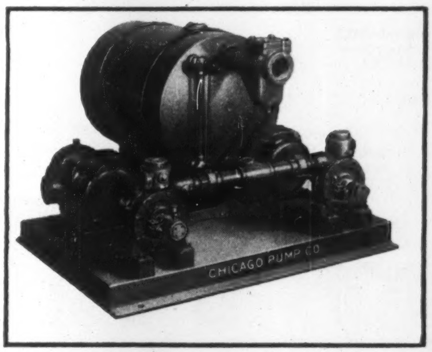
TYPE CLL1 VERTICAL CONDENSATION PUMP & RECEIVER

Specifically designed for low return service and underground installations. Flanges are accurately finished and gasketed to prevent steam leaks. Pump and receiver are shipped as a unit, ready to install. For 1000 to 40,000 EDR and 10 to 25 lbs. pressure. Described in Bulletin 255.



DUPLEX FC CONDENSATION UNIT

Single or duplex units are specifically designed for operating conditions where pressures are high and capacities relatively small. For duty up to 50,000 EDR and discharge pressures up to 150 lbs. Described in Bulletin 260.

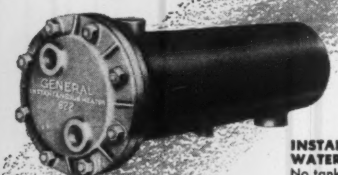


CHICAGO INDUSTRIAL PUMPS

As modern as a jet . . .

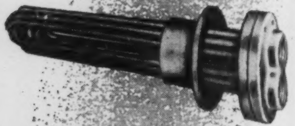
. . . and just as efficient

This specialized line of Industrial Fluid Heaters

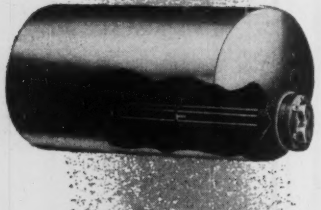


INSTANTANEOUS WATER HEATERS
No tank required. 23 sizes; capacities to 300 gpm.; uses live or exhaust steam.

CONVERTERS
26 sizes for economical heat transfer.

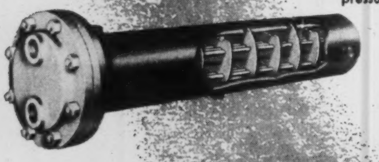


TANK HEATING UNITS
20 sizes for all requirements.

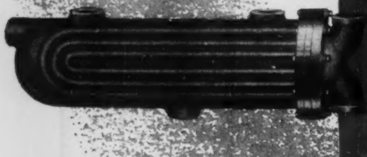


STORAGE TANKS
10 sizes; capacities to 315 gals.

FUEL OIL HEATERS
17 sizes; capacities to 375 gph. at 2 lbs. pressure.



INDIRECT HEATERS
15 sizes for use with large-size storage tanks.



Precisely engineered for maximum efficiency, this modern line of GENERAL Fluid Heating Specialties meets a wide variety of industrial applications. Whether you are planning a completely new installation, or the expansion or modernizing of an old one — you'll find a GENERAL unit that will give you efficient, extra long service at low cost. Detailed information is available in Catalog 60. Write for your copy. General Fittings Co., Dept. A, 123 Georgia Ave., Providence 5, R. I.

GENERAL GF

TANKLESS AND INDIRECT
WATER HEATERS AND HEATING SPECIALTIES

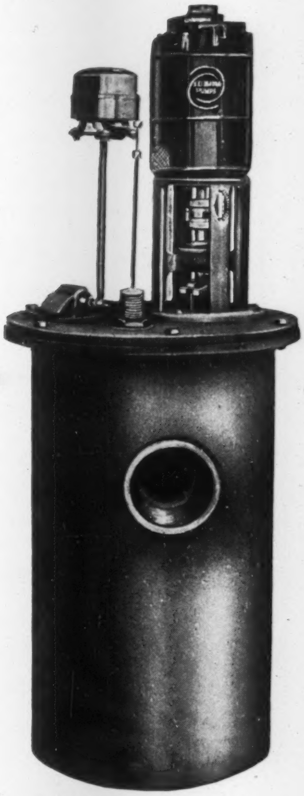
for top performance Skidmore Pumps

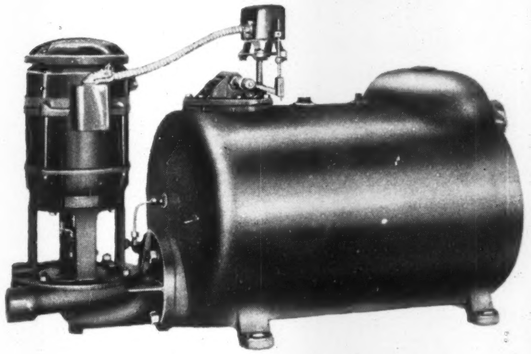
. . . leaders all the way

DESIGN, backed by 32 years of accumulated experience. Skidmore Heating Pumps, the proven choice of architects and engineers have consistently maintained the leadership throughout the years.

(ABOVE) **TYPE "HS"** — *BULLETIN NO. 14-A*

Highly efficient pump economically designed, mounted on steel base, also furnished with cast iron base and cast iron receiver. Pump is bronze fitted throughout. Designed in single and duplex units. Capacities from 1,000 to 65,000 sq. ft. E.D.R. and discharge pressures from 10 to 75 lbs.





(ABOVE) **TYPE "VC"** — *BULLETIN NO. 10-B*

Designed for rugged and dependable service. Simplicity of construction makes it easily accessible. Used for returning condensate to the boiler or other points, from all types of steam heating or process equipment. Furnished in single and duplex units. Capacities ranging from 1,000 to 65,000 sq. ft. E.D.R. and discharge pressures from 10 to 75 lbs.

(ABOVE) **TYPE "UV"** — *BULLETIN NO. 19-A*

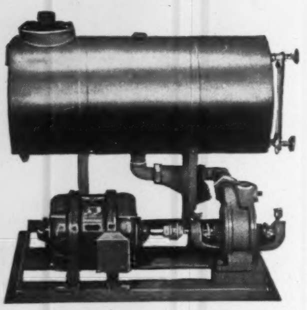
Recommended for underground installations or low returns — sturdily constructed in either single or duplex units. Vertical pump and motor assembly has float switch mounted on cover plate and is bolted to sump type receiver. Capacities ranging from 2,000 to 40,000 sq. ft. E.D.R. and discharge pressures from 10 to 75 lbs.

SKIDMORE BUILDS A TYPE FOR EVERY INSTALLATION

see other side

Skidmore Pumps

YOU can put full confidence in a SKIDMORE PUMP



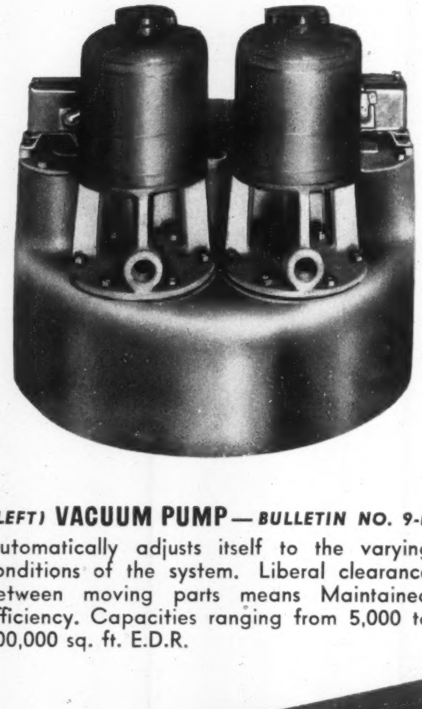
. . . for dependability
. . . for longer life

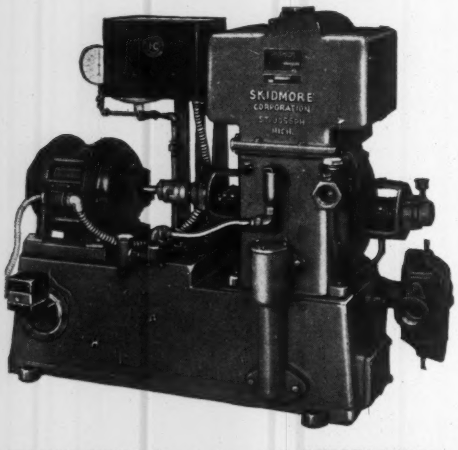
(LEFT)* TYPE "TM" — *BULLETIN NO. 17

The Skidmore High Pressure Turbine Type Pump is designed with motor and steel receiver, completely assembled and mounted on either steel or cast iron base as desired. Furnished in both single and duplex units. Pressures up to 150 pounds and boilers to 250 H.P.

(RIGHT)* TYPE "CV" — *BULLETIN NO. 21-A

Compact in design, but built for maximum efficiency in both single and duplex units. Shown right, is the duplex pump with two float switches. This model can also be furnished with automatic alternator affording a positive means of alternating the operation of the two pumps. Pump is ready to install on floor level or in pit. Capacities from 500 to 10,000 sq. ft. E.D.R. and discharge pressures from 10 to 20 lbs.





SINGLE UNIT also designed in DUPLEX UNIT

(LEFT)* VACUUM PUMP — *BULLETIN NO. 9-B

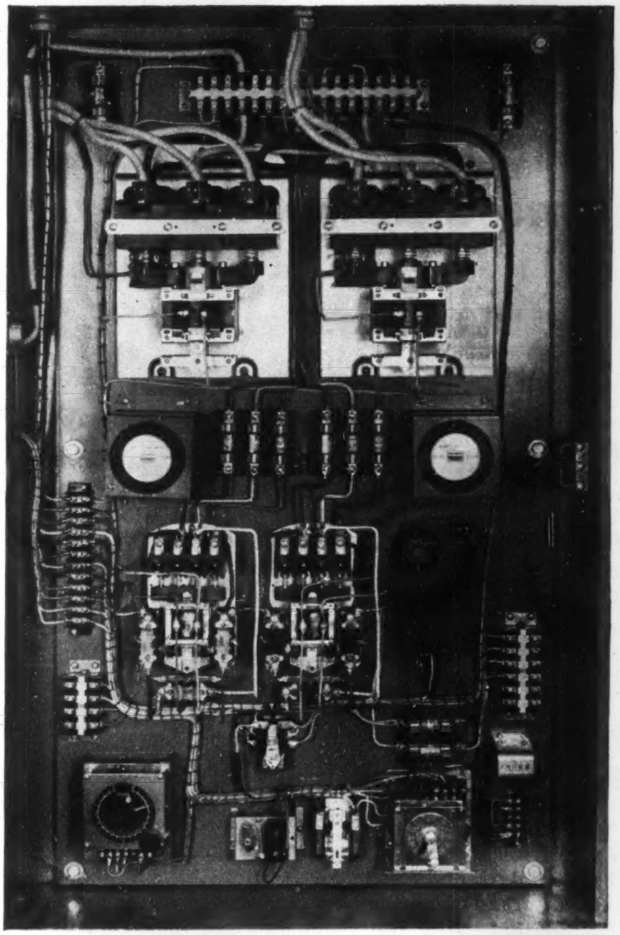
Automatically adjusts itself to the varying conditions of the system. Liberal clearance between moving parts means Maintained Efficiency. Capacities ranging from 5,000 to 100,000 sq. ft. E.D.R.

Skidmore Pumps have set a standard of performance and dependability through continual research and development since 1921.

SKIDMORE CORPORATION ● ST. JOSEPH, MICHIGAN

Write for Bulletins

Dehumidifier controlled by Ward Leonard contactors and starters



INTERIOR OF CONTROL PANEL shows two Ward Leonard three-pole contactors (near top of photo) and two motor starters (lower half of photo).

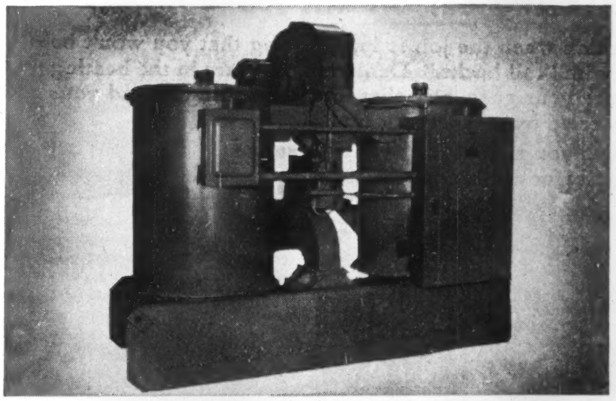
Two Ward Leonard three-pole solenoid contactors and across-the-line starters are an integral part of the control panel of the Desomatic Model DOR-800 Adsorbent Dehumidifier.

Daly, Merritt & Sullivan of Falls Church, Virginia, who manufacture the dehumidifier, needed electrical control components that could be readily installed in a custom control assembly.

The Ward Leonard contactors and starters which they selected fit this requirement because both are self-contained units . . . this results in simplified assembly, fast mounting and easy wiring.

Whatever the electrical requirements of your product, our engineers will be glad to help you select dependable controls to meet them. Write to Ward Leonard Electric Company, **24** South Street, Mt. Vernon, N. Y.

3-35



DESOMATIC DEHUMIDIFIER is used for preservation of equipment during long storage in warehouse buildings.

WARD LEONARD
ELECTRIC COMPANY
MOUNT VERNON, NEW YORK

RHEOSTATS RELAYS RESISTORS CHROMASTER

Result-Engineered Controls Since 1892

Ward Leonard's complete engineering textbook, "Handbook of Power Resistors," $3. per copy.

HERE'S DUNHAM'S NEW

you save time and trouble

1. BEFORE YOU EVER GET TO THE JOB

You can figure *any* hot water job faster . . . with less book work . . . when you depend on Dunham. One easy-to-use catalog puts the *industry's newest and most complete line* of hot water equipment right in your hands.

You save paper work, too, since one order to Dunham covers everything . . . not only circulators, valves, fittings, specialties and controls, but *all radiation* as well.

2. WHILE YOU'RE ON THE JOB

Since Dunham gives you everything you need in "one package" there's no need to hold up waiting for one "missing link." When you deal with Dunham, you get the *whole ball of wax at one time.*

Exclusive design improvements cut down installation time, too. Dunham's Balancing Fittings, for example, have a unique V-type seat that greatly simplifies balancing of the entire system. And on radiant heating jobs, Dunham's Distributor Heads cut installation time substantially.

3. AFTER YOU GET OFF THE JOB

You can relax when the job is in, knowing that you won't be bothered with "call backs." Dunham's 50 years in the heating business are your guarantee that from beginning to end your job is protected by equipment of the highest quality.

And when you make it a complete Dunham job, you put full responsibility for finished performance squarely up to *one manufacturer.*

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RADIATION • UNIT HEATERS • PUMPS • SPECIALTIES . . .

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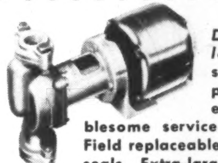
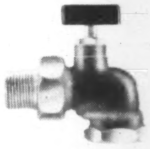
COMPLETE HOT WATER LINE

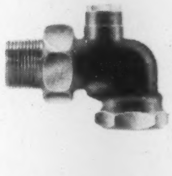
all this...and radiation too!



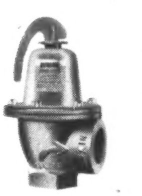
Dunham Circulators. Single spring motor-pump coupling eliminates troublesome service requirements. Field replaceable carbon rotary seals. Extra-large oil reservoir. Only well-known motors used. Two-bolt flange simplifies installation.



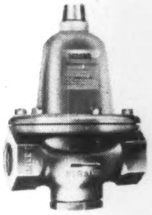
Dunham Circulator Valves. Exclusive extra-large water flow area reduces friction and pump load. Valve fully opens or closes with ¼ handle turn. Valves are self-cleaning.



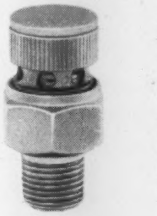
Dunham Balancing Elbows and Fittings. Free water flow area larger than other balancing fittings; reduce friction and pump load. *Sloping valve seat* provides V-shaped opening for *more accurate balancing* than usual vertical seat types.



Dunham Pressure Relief Valves. Diaphragm type. Spring chamber sealed against discharge water. No guides on discharge side to stick or jam. Factory set at 30 lb. pressure.

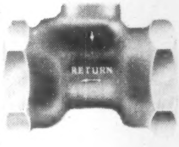


Dunham Pressure Reducing Valves. Built-in strainer; extra-large diaphragm. Special composition disc prevents chattering. Factory set at 12 lb. Adjustable. Combination relief and reducing valve available.

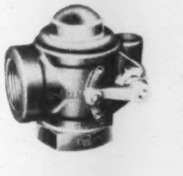


Dunham Expansion Type Air Vent. Cannot get out of order! Automatic venting. No adjustments needed. Can be manually shut off. *Not necessary to drain system to replace disc.* Maximum working pressure: 50 p.s.i.

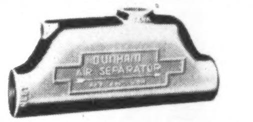
Dunham Float Type Air Vent. Built-in siphon prevents "spitting," eliminates need for drain tube. Can be completely disassembled easily and quickly. Maximum working pressure: 35 p.s.i.



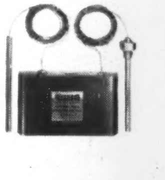
Dunham Flow Divertor Fittings. Assure proper hot water flow through all radiation units regardless of location. Only one fitting normally needed for each unit of radiation whether above or below main. All brass; thread or sweat connections.



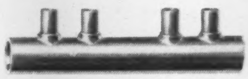
Dunham Flow Control Valves. Completely automatic. No adjustment needed for winter-summer operation. Easy to clean without breaking pipe connections or removing valve mechanism.



Dunham Air Separator. Performs dual function: passes air from system to expansion tank and prevents re-entry into system; vents remaining excess air to atmosphere. Heavy one-piece construction.



Dunham Vari-Flow Controls. Fully automatic indoor-outdoor temperature control for all types of hot water heating systems. Balances heat output with heat demand created by outdoor weather. Eliminates indoor thermostat.



Dunham Distributor Heads. For radiant hot water. 1¼" trunks with interchangeable ⅜" or ½" branches. Shipped in 5'3" lengths, each having 14 pairs of connections. Simple to cut on the job.

COMPLETE INFORMATION

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Chicago 6, Illinois

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WATTS

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No. 127 and No. 125, sizes 1/2" to 3" No. 152, sizes 1/2" t

For Steam - Air - Water

3

PAGE 2

No. 127 SPRING TYPE FOR STEAM & WATER

Single Seated **DIAPHRAGM PRESSURE REGULATORS**

For steam heating and process applications

No. 125 WEIGHT & LEVER TYPE FOR STEAM

No. 127 and No. 125 SPECIFICATIONS

INSTALLATIONS

Outstanding maintenance features of No. 127 and No. 125

PAGE 4

No. 152 FOR STEAM & AIR SERVICE

Self-contained **PROCESS REGULATOR**

PAGE 5

FEATURES

Send for this Catalog Folder #539

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Heat Up Steam Units

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- Here's the most profitable steam trap news to reach your ears in many years! The new Heat-Kwiks vent air out of steam consuming units *eight times* faster than ordinary inverted bucket traps . . . three times faster than air eliminator or blast type traps. This faster removal of air means faster heating up . . . more production . . . lower steam consumption . . . and reduction in trap capacity factor. Use Heat-Kwik Super-Silvertops on every steam-using unit. You'll get heat much faster . . . and reduce steam costs. The savings will quickly pay for your Heat-Kwik investment.

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Quality Steam
Traps Since 1886

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☐ Bulletin 1153 (Heat-Kwik Steam Traps)
☐ Solving Steam Trap Problems (36-page catalog)
☐ Bulletins on Hi-eF Purifiers

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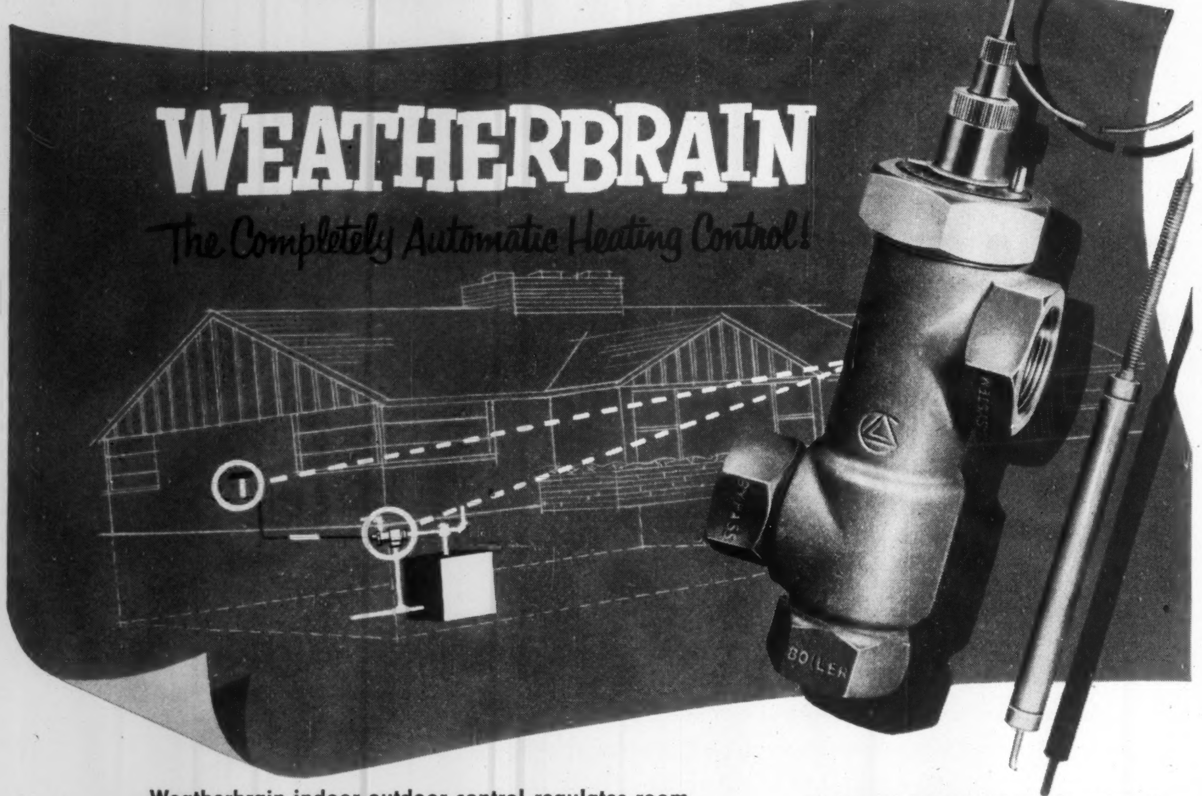
Now From DETROIT Comes

the biggest sales booster to hit the hot water heating field in years!


WEATHERBRAIN
The Completely Automatic Heating Control!
BYPASS
BOILER

Weatherbrain indoor-outdoor control regulates room temperature all winter long without ever a manual adjustment.

Now you can cash in on big, new profits in the hot water heating field with DETROIT'S amazing Weatherbrain Control.

That's because Weatherbrain indoor-outdoor control offers heating comfort never before possible in forced hot water heating systems—constantly uniform and completely automatic. Once installed, the user never makes a manual adjustment of any kind. The Weatherbrain Control's outdoor bulb senses changes in outside temperature and responds instantly by supplying the exact amount of heat to keep room temperature right where it should be! And because it is entirely mechanical in operation with no expensive, complicated electronic gadgets to go wrong, Weatherbrain Control is less costly and more easily installed than any other control of its type. See your DETROIT wholesaler or write for Bulletin No. 254.

CHECK THESE FEATURES

- Varies the water temperature delivered to panels or radiation in exact accordance with the demands of the weather.
- All mechanical; no delicate mechanisms, electronic tubes or relays.
- Well adapted to zone systems because of its simplicity and reasonable cost, and where the electrical boiler resetting type control will not work.
- Gradual changes in water temperature in the system minimize the undesirable effects of thermal expansion and contraction.
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Architects: Russell, Mullgardt,
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- The distributors on this list all handle Republic ELECTRUNITE Enduro Stainless Steel Tubing and Pipe. Stainless Steel Tubing is electrically welded in ⅜″ to 5″ O.D. with wall thickness to 25 ga. to 8 ga., depending upon size. Stainless Steel Pipe comes in sizes from ⅛″ I.P.S. through 2″ I.P.S. in A.S.A. schedule 40S; from ⅛″ I.P.S. through 4″ I.P.S. in schedule 10S; and from ½″ I.P.S. through 4″ I.P.S. in schedule 5S wall thicknesses.

Both ELECTRUNITE Stainless Steel Tubing and Pipe are stenciled for your positive identification prior to use. No matter where the pipe or tubing are cut, they can still be identified.

When you need Stainless Steel Tubing and Pipe, call your nearest Republic ELECTRUNITE distributor. He'll be glad to supply you.

STAINLESS TUBING

Mechanical and Pressure

Size	Range (BWG)	Size	Range (BWG)
⅜″	16-25	1⅝″	10-20
7/16″	16-25	1 11/16″	10-20
½″	14-25	1¾″	10-20
9/16″	14-25	1⅞″	10-20
⅝″	14-24	2″	9-20
11/16″	14-24	2⅛″	9-20
¾″	13-24	2¼″	9-20
13/16″	13-24	2⅜″	8-20
⅞″	12-23	2½″	8-20
15/16″	12-23	2⅝″	8-20
1″	11-23	2¾″	8-20
1 1/16″	11-22	2⅞″	8-20
1⅛″	11-22	3″	8-20
1 3/16″	11-22	3¼″	8-16
1¼″	11-22	3½″	8-16
1 5/16″	11-20	3¾″	8-16
1⅜″	11-20	4″	8-16
1 7/16″	11-20	4½″	8-16
1½″	10-20	5″	8-16
1 9/16″	10-20		

REPUBLIC ELECTRUNITE ® STAINLESS TYPE 304 HEAT#78910 SPEC-A-312
REPUBLIC
STAINLESS TYPE 347

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McGowan-Lyons Hardware & Supply Co., Mobile

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Ducommun Metals & Supply Co., Los Angeles
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KENTUCKY
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MARYLAND
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STAINLESS STEEL PIPE

Pipe Size	Outside Diameter	Schedule 40S Wall	Schedule 10S Wall	Schedule 5S Wall
⅛″	.405″	.068″	.049″	.....
¼″	.540″	.088″	.065″	.....
⅜″	.675″	.091″	.065″	.....
½″	.840″	.109″	.083″	.065″
¾″	1.050″	.113″	.083″	.065″
1″	1.315″	.133″	.109″	.065″
1¼″	1.660″	.140″	.109″	.065″
1½″	1.900″	.145″	.109″	.065″
2″	2.375″	.154″	.109″	.065″
2½″	2.875″	.....	.120″	.083″
3″	3.500″	.....	.120″	.083″
3½″	4.000″	.....	.120″	.083″
4″	4.500″	.....	.120″	.083″

Stainless Steel Pipe sizes are available in the chrome-nickel analyses and to a limited degree in the straight chrome types. Inquiries for larger diameters should be referred to your Steel and Tubes Division Representative.

STEEL AND TUBES DIVISION
REPUBLIC STEEL CORPORATION
231 EAST 131st STREET • CLEVELAND 8, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

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STAINLESS STEEL TUBING AND PIPE

EQUIPMENT DEVELOPMENTS...

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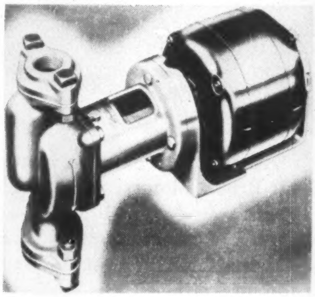
New line of hot water heating equipment. . . . Supplementing the manufacturer's line of steam heating equipment, the new line includes circulators, valves, fittings, specialties and controls, in addition to the regular line of baseboard, convectors, finned pipe and unit heaters. The new circulator valves are said to have large water flow areas; balancing elbows and fittings are designed with a sloping valve seat. The line also includes expansion-type air vents for automatic venting and for manual shut off, flow control valves, a distributor head for radiant heating installations and an automatic indoor-outdoor temperature control system known as "Vari-Flow."


Circulator

Manufacturer—C. A. Dunham Co., 400 W. Madison St., Chicago 6.

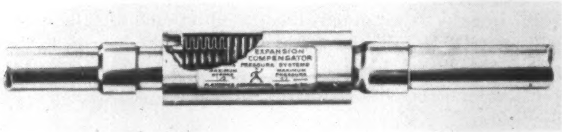
One-Inch Air Filter

All metal, high velocity, one-in. filter. . . . Stiffening the media is obtained by a gabled crimp design. In this design the change in passage direction inherent in the herringbone crimp is retained and the effectiveness of the flat screen layers is increased by gabling the crimped and flat layers simultaneously. The manufacturer states that it holds up to 800 grams of standardized fine air cleaner test dust before cleaning is necessary. The filters are said to load progressively without pressure loss.

Manufacturer—Farr Co., P.O. Box 10187, Airport Station, Los Angeles 45.

Expansion Compensator

Expansion compensator for hot water and steam heating systems said to require no maintenance or adjustment. . . The compensator is a phosphor bronze bellows protected by a floating brass shroud to help guide expansion and contraction strokes of the bellows in a straight line. The manufacturer states that the device may be installed in low pressure steam or hot water lines carrying pressures from 40 psi to 60 psi and temperatures up to 250 F. It was especially designed for finned-type convectors, baseboard, radiator or heating supply and return lines. Diameters of 3/4, 1, 1-1/4 and 2 in. are available. The manufacturer states that one compensator will absorb expansion for up to 30 ft of copper tube or 50 ft of steel pipe, depending on operating conditions.

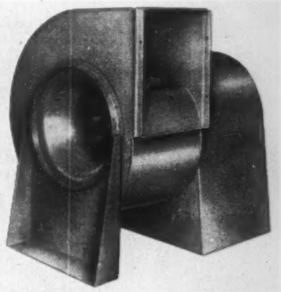


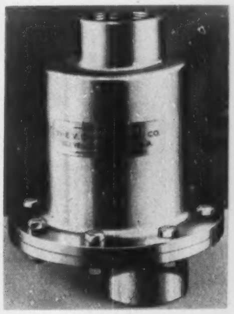
Manufacturer—Flexonics Corp., 1391 S. Third Ave., Maywood, Ill.

Stainless Steel Float Trap

New float trap made of stainless steel for draining corrosive liquids from air, gas and steam confined in piping systems and equipment. . . . According to the manufacturer, the automatic trap drains liquids as fast as they are formed without permitting the escape of air or gas. The trap mechanism consists of a valve and seat, a lever, and a ball float inside a case. The liquid, upon entering the unit at the top, raises the float, opening the valve, and permitting the escape of the liquid. An accumulation of any steam or gas lowers the liquid float, causing the float to drop. This action closes the valve. The trap, made in sizes 1/2 in. to 2 in., is designed for 300 lb pressure and maximum total temperature of 800 deg.

Manufacturer—The V.D. Anderson Co., 1935 W. 96th St., Cleveland 2, Ohio.


Ventilating Set


Float Trap

Ventilating Set

Ventilating set consisting of a fan, motor and drive in a single package. . . Available in two series, the "900" series is direct-drive from fan to motor with six sizes giving an air volume range of 200 to 3200 cfm capacity. Featuring an adjustable V-belt drive, the 12 sizes of the "1000" series give capacities from 375 to 14,400 cfm. All units are powered by the manufacturer's standard motors. Weatherproof covers are available when outdoor mounting is desired. Direction of discharge may be adjusted. Sizes range from 54x67x58 in. down to 10x12x18 in.

Manufacturer—Westinghouse Electric Corp., Sturtevant Div., 200 Readville St., Hyde Park, Boston 36, Mass.

Union Bonnet Gate Valves

New line of 125 and 150 lb union bonnet bronze gate valves. . . . The new valves feature heavy lug-

EQUIPMENT DEVELOPMENTS . . .

[Continued]

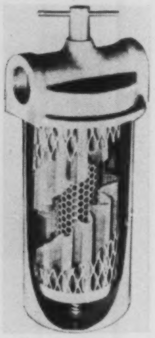
type hexagonal union rings designed to require a minimum of turning effort to seal the flat-mating surfaces of body and bonnet against leakage. A flexible T-type stem to wedge connection includes wedges of bronze which are specially fitted to heavy duty integral seats. Thread chamfers are proportioned to prevent the ends of the connecting pipe from contracting the seat walls and springing them out of shape. Full-size ports are designed to keep turbulence and pressure drop to a minimum.

Manufacturer—The Ohio Injector Co., 275 Main St., Wadsworth, Ohio.

Gas Unit Heater

Seven models of self-contained automatic heating unit ranging in capacity from 25,000 Btu to 200,000 Btu heat input. . . . Design features include raised port design burner, removable burner drawer, automatic gas control valve, gas pressure regulator, and an automatic safety pilot to prevent discharge of gas in the event the pilot burner is extinguished. The manufacturer states that the heater has quick response, requires no fuel storage, eliminates overnight and weekend firing and conserves floor space. The unit can be used with natural, manufactured, mixed, or liquefied petroleum gas. Burners, orifices and controls are varied according to the characteristics of the gas to be used.

Manufacturer—Warren Webster & Co., 1664 Federal St., Camden, N. J.



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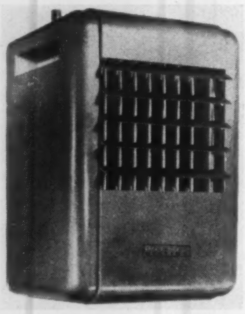


Heater

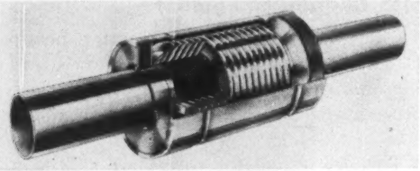
Water Filters

Adaption of all models of the company's sump and line type filters for water applications. . . . The basic synclinal design has been retained. Available for either sump or line installation, the units are made in eight capacity sizes from 5 to 100 gpm. Greater capacities are attained by multiple installations. Mesh sizes to handle various size particles range from coarse 30 to very fine 200.

Manufacturer—Marvel Engineering Co., 625 W. Jackson Blvd., Chicago 6.

Expansion Joint for Baseboards

Expansion joint designed for use with the manufacturer's baseboard heating systems and heating installations using the "Walvector." It is available in ¾-in., 1-in. and 1¼-in. sizes. Each size provides for ½-in. movement. Known as the "Tru-Perimeter" expansion joint, it is cylindrical in shape with dimensions kept so that it will fit behind baseboard enclosures. It is designed for sweat connections.



Manufacturer—Warren Webster & Co., 1664 Federal St., Camden, N. J.

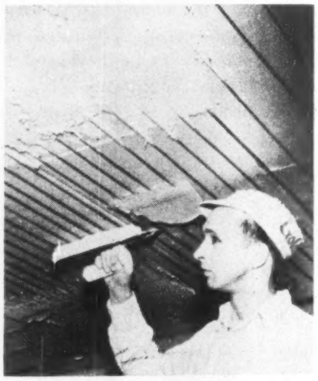
A-C Motors

Alternating current motors which are manufactured by Brook Motors, Ltd., England . . . . The major types are designed for use as original equipment in commercial refrigeration and heating and ventilating units, in machine tools, pumps and compressors. Those stocked for marketing in this country range from 1 to 50 hp. Both single and polyphase motors are offered in four types—open drip-proof, splash proof, totally enclosed non-ventilated and totally enclosed externally fan-cooled. Ball bearings are interchangeable and are standard, as are nuts and threads.

Distributed by—Brook Motor Corp., 3557 W. Peterson Ave., Chicago 45.

Radiant Heating Cable

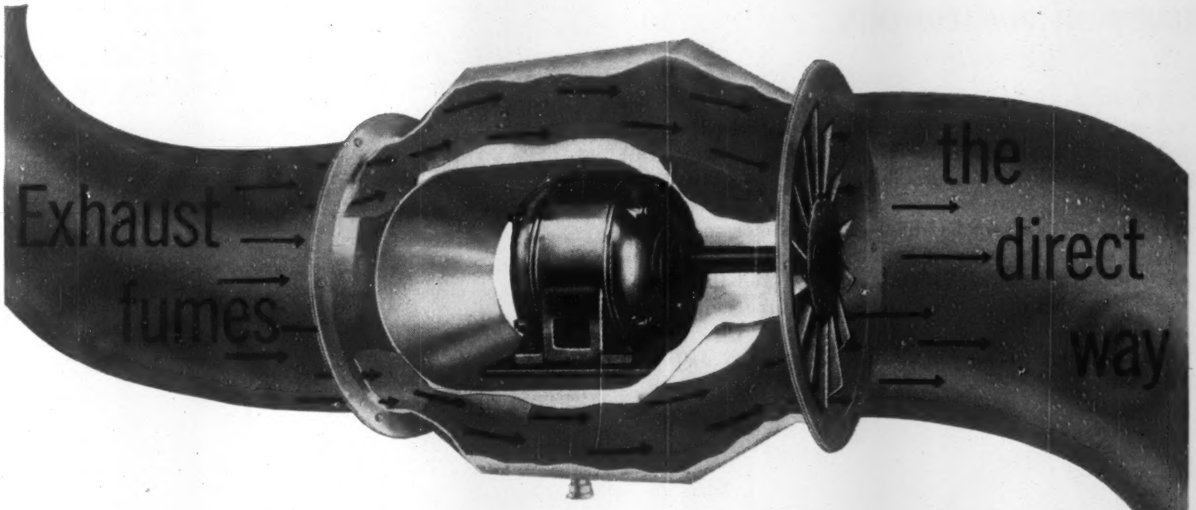
Heating cable for ceiling installation so that heat is radiated downward. . . . Automatic temperature control is obtained by a separate thermostat in each room. The company states that this system creates even temperatures. The cable is made of insulated electric wires designed to be waterproof and non-corrosive. A "Magic Seal" is said to eliminate the possibility of streaks on the ceiling. To install, the cable is stapled to the ceiling lath and covered with plaster.



Manufacturer—Electromode Corp., 45 Crouch St., Rochester 3, N. Y.

Remote Reading Tank Gage

"Keco" remote reading tank gage for use with vented fuel oil, gasoline and diesel oil tanks to



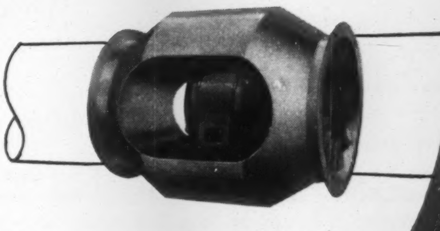
BIFURCATOR FAN EFFICIENTLY EXHAUSTS HOT, CORROSIVE, FLAMMABLE AND EXPLOSIVE FUMES

Bifurcator Fans exhaust fumes at *top efficiency* by avoiding a directional change in the air stream. Other fans often require a 90° change in direction of the exhaust stream with resultant loss in efficiency.

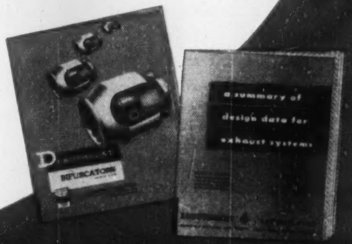
The fan motor stays clean, cool and accessible. Fumes are by-passed (bifurcated) around the motor chamber which is completely isolated from the exhaust stream.

A Bifurcator Fan is easily installed . . . just like a flanged section of ductwork. It can be mounted horizontally, vertically or at an angle. Lightweight and extremely compact, a Bifurcator requires no platform or supports. Bifurcators are available in sizes from 1140 CFM (12″ diameter fan with 1/20 HP motor) up to 45,000 CFM (48″ diameter fan with 20 HP motor). Housings and fan wheels can be fabricated of non-corrosive metals, or can be protected with a variety of corrosion-resistant coatings.

Be ready with the facts about Bifurcators next time you have a fume removal problem. Fill in and mail the handy coupon below . . . TODAY!



Bifurcator Fan installs just like a section of ductwork.



"DESIGN DATA FOR EXHAUST SYSTEMS" This helpful bulletin contains details, simplified data and charts. Compiled by Allen D. Brandt, Senior Sanitary Engineer, U. S. Public Health Service. Mail coupon for your FREE copy and Bifurcator Bulletin.

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DEBOTHEZAT FANS DIVISION
Dept. HP-154
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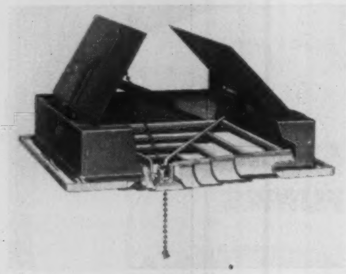
NAME AND TITLE ____________________

EQUIPMENT DEVELOPMENTS . . .

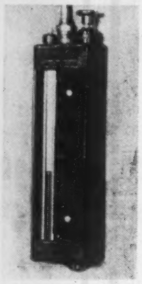
[Continued]

9 ft depth. . . . The gage shows the depth of fuel in inches and may be located at any reasonable distance from the tank and at any elevation. The etched aluminum scale plate has four different scales for use with fuels of varying API gravities. Only one scale is visible at a time. The gage works as a frictionless hydrostatic balance and has no moving mechanical parts except a small air pump built into the case. All parts of the tank are steel and the case is made of molded nylon. A 1/4-in. copper tube connects the tank and gage.

Manufacturer—King Engineering Corp., Box 310, Ann Arbor, Mich.



Diffuser



Gage

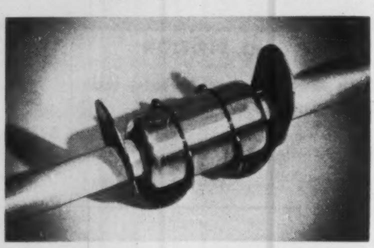
Square Ceiling Diffuser

Square type ceiling diffuser designed to give good diffusion without drafts. . . . The "Series 60" has a series of step down vanes that discharge air outward and slightly downward in all directions at reasonably high velocity. It can be installed either as a warm air or cooling outlet. The manufacturer also recommends it for return air, especially for perimeter installations. The damper has a center opening which delivers air through the center of the diffuser. The "Balancing Bell" control feature is designed to provide simplfied balancing by putting the volume control right in the diffuser. An installation ring 2 1/4 in. deep is available when a damper is not used.

Manufacturer—Lima Register Co., 651 N. Baxter St., Lima, Ohio.

Spring-Operated Coupling

Coupling which is designed to require no threading, flares, ferrules or tools to make the connection. . . . . One of the principles is the grooving of the interior of the coupling. At each end there are grooves containing rubber O-rings or silicone or tefalon rings depending upon use. The sleeve is tapered on the inside to allow for any variation in the outside diameter of the tubing or pipe. The coupling has a stop in the center that allows the insertion of the tubing or pipe to fit equally in each side. The spring clip is pressed, the tube inserted and the spring is then released. The spring clip grips tighter as pull pressure is applied.



Manufacturer—The Master Enterprise Corp. of America, Executive Offices, Boulder Bldg., Tulsa, Okla.

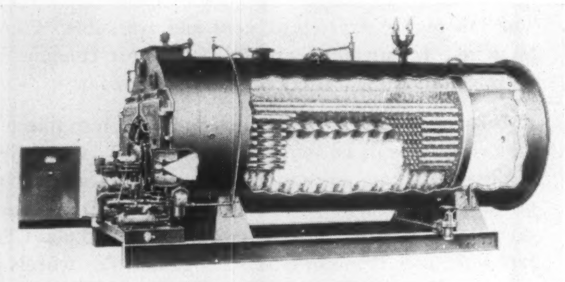
Corrosion Resistant Plastic Pipe

Lightweight, rigid plastic pipe and slip-sleeve fittings designed to resist chemical corrosion. . . . The plastic pipe is made from polyvinyl chloride resin plastic, produced by B. F. Goodrich Chemical Co., is said to be five times lighter than metal pipe of the same size. The slip-sleeve fittings are cemented to the pipe with a solvent chemical applied by a brush. The company states that the connections are equal in strength to any other part of the pipe. In addition, the manufacturer reports that the smooth hard surface of the plastic pipe increases flow.

Manufacturer— Alpha Plastics Inc., West Orange, N. J.

Boiler-Burner Unit

New boiler-burner combination manufactured jointly by Kewanee-Ross Corp. and Petro. . . . The units include both steam and water models, ranging in sizes from 39 to 456 hp for high pressure steam and from 1,313,000 to 15,300,000 Btu for 15 lb steam or 30 lb water. All models are equipped for firing No. 6 or lighter oil, or for high or low pressure gas, or for a combination of the two. Engineered as one complete boiler-burner unit, the boilers and burners are manufactured separately by the two companies. Matching connections make it possible to attach the burner to the boiler. Refractories are integrally mounted at the factory. The boilers are scotch type and are mounted on steel skids. The burners include forced draft air supply and all combustion controls, mounted and pre-wired in one central control cabinet.

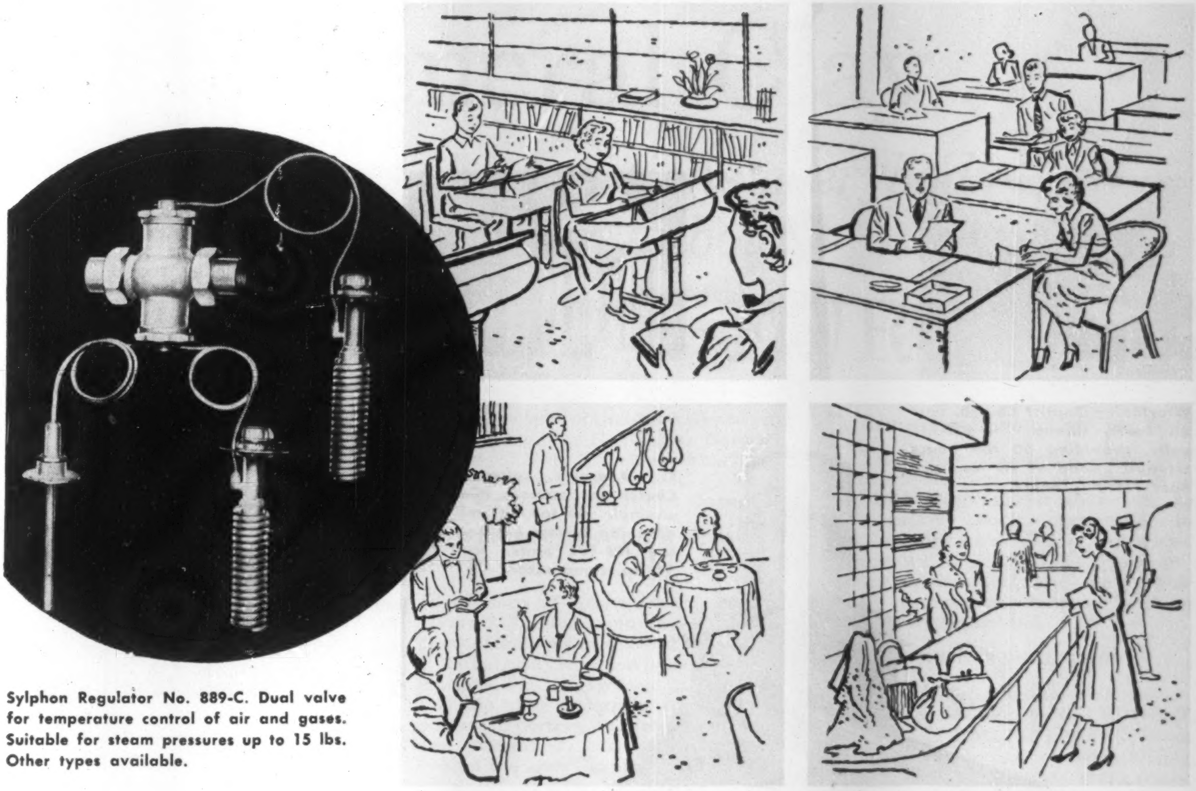


Manufacturers—Kewanee-Ross Corp., Kewanee, Ill., and Petro, 3170 W. 106th St., Cleveland 11, Ohio.

Diaphragm Motor Control Valves

New line of diaphragm motor control valves designed for use with wide-band proportional control instruments. . . . The "Series 800" features a redesigned diaphragm motor with pressed steel case plates, and a yoke with mounting bosses on both sides for auxiliary equipment, a locking arrangement for securing the body stem to the spring stem, and either bolted or screwed stuffing boxes. The new line also incorporates direct-

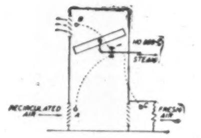
[Continued on page 302]



Sylphon Regulator No. 889-C. Dual valve for temperature control of air and gases. Suitable for steam pressures up to 15 lbs. Other types available.

DEPENDABLE COMFORT wherever it goes!

Sylphon Control



Packaged Air Conditioner. Room temperature held constant by main port of No. 889-C from bulb "A" in recirculated air. Bulb "B" in discharge serves as "low limit" control to prevent cold drafts, with outdoor compensating bulb "C" to prevent "droop." For simplicity, the illustration above does not show condensing unit, filter, cooling coils or other details.

● In schools, offices, hotels, stores, institutions, theaters—wherever comfortable, constant temperature is required—thousands of Sylphon temperature regulators are on the job. For Sylphon controls are designed to meet any and every heating, ventilating or air conditioning requirement. One or a combination of these dependable regulators handles the job efficiently—inexpensively.

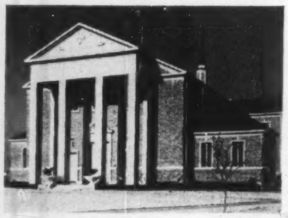
Sylphon Regulator 889-C, pictured here, is one of the Sylphon line. It is used for control of duct heating and ventilating systems. Fully modulating and self-powered, it has a simple dial adjustment—maintains temperature as wanted. No exposed operating mechanism—no wiring—no air piping required. Its packless valve eliminates service problems. Built for long, trouble-free service—like all Sylphon controls.

Write for details about Regulator 889-C, or for helpful information about other Sylphon Controls for your particular heating, ventilating or air conditioning requirements. Ask for Catalog AH-B.

Robertshaw-Fulton
CONTROLS COMPANY

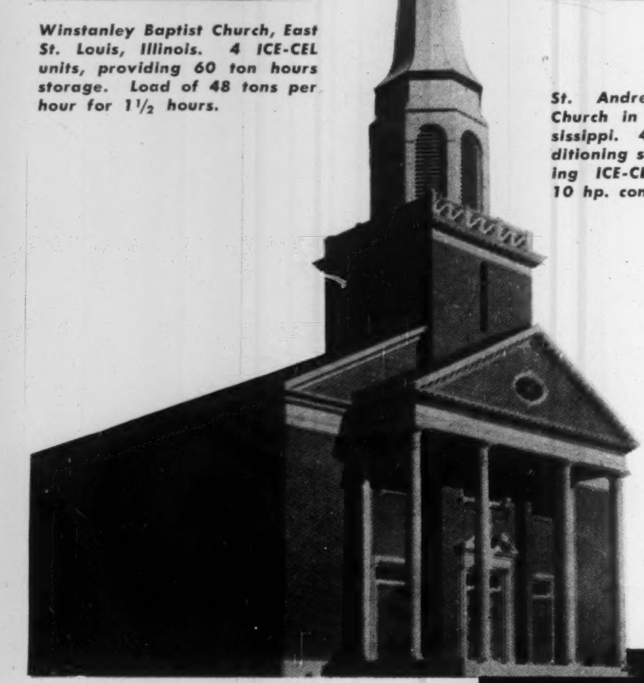
FULTON SYLPHON DIVISION
Temperature Controls • Bellows Devices • Bellows Assemblies
KNOXVILLE 1, TENNESSEE

Winstanley Baptist Church, East St. Louis, Illinois. 4 ICE-CEL units, providing 60 ton hours storage. Load of 48 tons per hour for 1½ hours.



University Park Methodist Church in Dallas, Texas. Equivalent of 5 ICE-CEL units installed, with a combined capacity of 200 ton hours of refrigeration.

St. Andrews Episcopal Church in Jackson, Mississippi. 45 ton air conditioning system employing ICE-CEL units, with 10 hp. compressor.

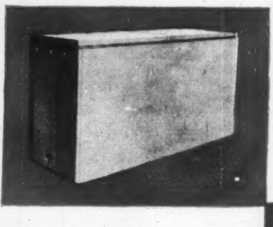


Central Presbyterian Church in Jackson, Mississippi . . . 2 ICE-CEL units, with a combined capacity of 192 ton hours — 40 ton hours in excess of actual requirements, which can be utilized for special occasions.

When the best in *air conditioning* is required . . . specify *Ice-Cels*

Ice-Cel **units are especially applicable for the air conditioning of churches, offices, stores, theaters, auditoriums, cafeterias, and mortuaries — where heavy cooling loads are of relatively short duration. Initial investment is small and operating costs are low. Dole engineers will be glad to help you plan the most efficient air conditioning system to fit your needs . . .**

WRITE FOR ENGINEERING CATALOG BE.



The compact design of an ICE-CEL unit permits easy installation in a small space.

Maximum Refrigeration Efficiency
DOLE
MANUFACTURERS OF
THE *Cel* LINE

DOLE REFRIGERATING COMPANY

5918 N. Pulaski Rd., Chicago 30 • 103 Park Ave., New York 17

In Canada: Dole Refrigerating Products, Ltd., 44 Elgin St., Brantford, Ontario

General Clay

answers the questions everybody is asking about

RADIO FREE EUROPE

General Lucius D. Clay, former U. S. Military Governor in Germany, and leader of the Berlin Airlift, was first Chairman of the Crusade for Freedom.

General Lucius D. Clay answers nine vital questions about an organization which needs your dollars and your support—Radio Free Europe.

RFE is important to *you* and to millions of freedom-loving people behind the Iron Curtain, *who are our first line of defense against Soviet aggression.* General Clay tells why:

Q. What is "Radio Free Europe"?

A. Actually, it is 6 stations in Western Europe broadcasting TRUTH through the "Iron Curtain" to the people of 6 captive countries in their own tongues and in the voices of their own known and trusted exiles.

Q. What is the difference between Radio Free Europe and the Voice of America?

A. The Voice of America is run and paid for by the Government. Radio Free Europe is operated as an independent American enterprise by a committee of private citizens. It is *people* talking to *people*—Poles telling the truth to Poles, Czechs and Slovaks telling the truth to Czechs and Slovaks, etc. It is not bound by diplomatic limitations.

The Voice of America broadcasts to many countries and can only devote a limited amount of time each day to any one country. But Radio Free Europe's "Voice of Free Czechoslovakia", for example, broadcasts about 20 hours each day to Czechoslovakia alone.

Q. Who supports Radio Free Europe?

A. Millions of American citizens like yourself, through voluntary contributions of millions of dollars! More than 1,000 carefully screened people man the stations. The management is American, but the staff is largely composed of editors, reporters, teachers, clergymen and entertainers who have come from behind the Iron Curtain.

Q. What countries does Radio Free Europe reach?

A. Czechoslovakia, Poland, Romania, Bulgaria, Hungary, and Albania with a total of 70,000,000 population.

Q. How does Radio Free Europe get its news?

A. Radio Free Europe monitors most Communist broadcasts. Every program is analyzed by nationals of the captive countries who *know the truth.* Voluminous information from many sources is compiled and evaluated constantly by exiled experts. New exiles bring out new truth daily—and they bring it to RFE.

Q. Are more transmitters needed?

A. Yes. More transmitters and still more transmitters are needed now to let truth speak louder than ever to those captive people. Transmitters in new locations are needed too—as added insurance that this "Voice of Freedom" will never be stilled. Each new transmitter insures a new listening position on a captive radio dial.

Q. How much is needed now?

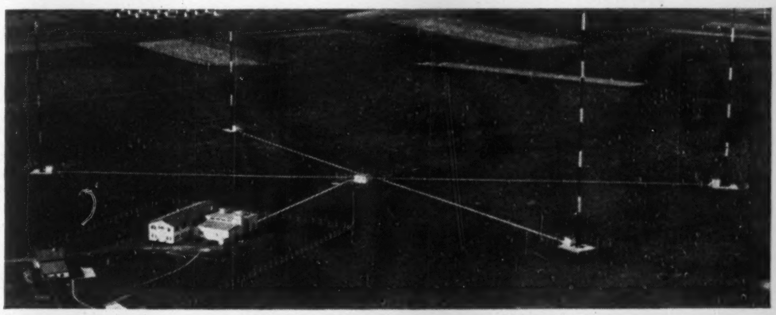
A. At least $10,000,000. But, as important as the money, the WIDEST POSSIBLE PARTICIPATION—to communicate the truest possible feeling of FRIENDSHIP FROM MILLIONS OF AMERICAN PEOPLE IN ALL WALKS OF LIFE.

Q. How much should one individual give?

A. All he can . . . A "truth dollar" is suggested.

Q. Why is Radio Free Europe so important to me?

A. Because it is devoted to the single most important job in the world—to help keep World War III from happening. If 70,000,000 people in the six Iron Curtain countries continue to resist Soviet tyranny, the Kremlin is kept off balance in one of the most strategically sensitive areas in the world.



This transmitter at Holzkirchen, Germany, is the largest of Radio Free Europe's 21 outlets. It has brought protests from angry Communists in Czechoslovakia where it is beamed 20 hours a day.

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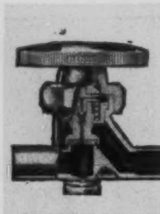
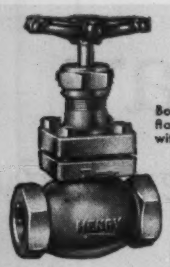
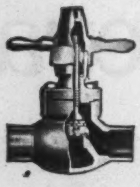
RADIO FREE EUROPE *supported by* **CRUSADE FOR FREEDOM**



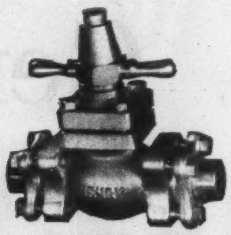
PACKLESS VALVE
With balanced-action



AMMONIA VALVE
Bolted Bonnet — screw or flanged connections. Also with screwed bonnet, sizes 1" and under



WING CAP VALVE
Non-ferrous



WING CAP VALVE
Semi-steel—with companion flanges and adapters

HENRY VALVE CO.
CONTROLLING FLOW
SINCE 1914

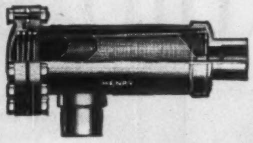
you pay—

no premium for..

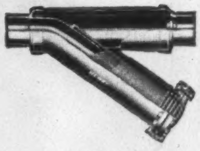
the extra advantages found in

Henry products

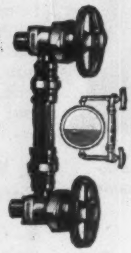
or for the extra satisfaction that follows their use



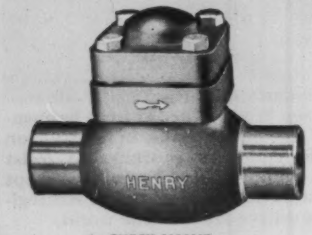
STRAINER
Angle type with patented distortion-proof flange



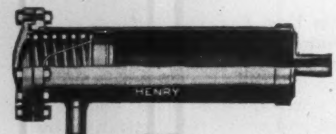
Y-STRAINER
Brass plated. Welded steel construction with forged brass connections. Size ⅝" O. D. S. through 4⅛" O. D. S.



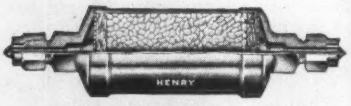
BALANCED-ACTION PACKLESS LIQUID LEVEL GAUGES
Valves are backseating—diaphragms may be inspected or replaced without loss of liquid. Conforms with all safety code requirements.



CHECK VALVE
Piston Type For Freon. Sizes ⅜" through 4⅛" O. D S.



DRIER
Cartridge type 12 to 500 cu. in. capacity. Sizes ⅜" to 2⅛" O.D.S



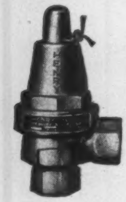
DRIER
Large diameter and capacity—minimum pressure drop.

... Write for these catalogs

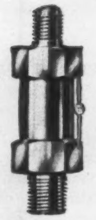
No. 101 Packless and packed valves, strainers, driers, ammonia valves, check valves, relief valves, three-way valves, scale traps, liquid gauge sets, flange unions, nut unions and accessories for air conditioning and refrigeration and industrial uses.

No. 201 Ammonia valves and accessories.

No. 70 Drop forged and cold rolled steel fittings.



DIAPHRAGM RELIEF VALVE
Large capacity—fast positive relief and reseating action. Very small differential between opening and closing pressures.



STRAIGHT-THROUGH RELIEF VALVE
Large capacity—All Brass Construction. Sizes ¼" M.P.T. through 1" F.P.T.

Stocked and Sold by Leading Jobbers

VALVES • DRIERS • STRAINERS • CONTROL DEVICES and ACCESSORIES FOR REFRIGERATION and AIR CONDITIONING and INDUSTRIAL APPLICATIONS

HENRY VALVE COMPANY

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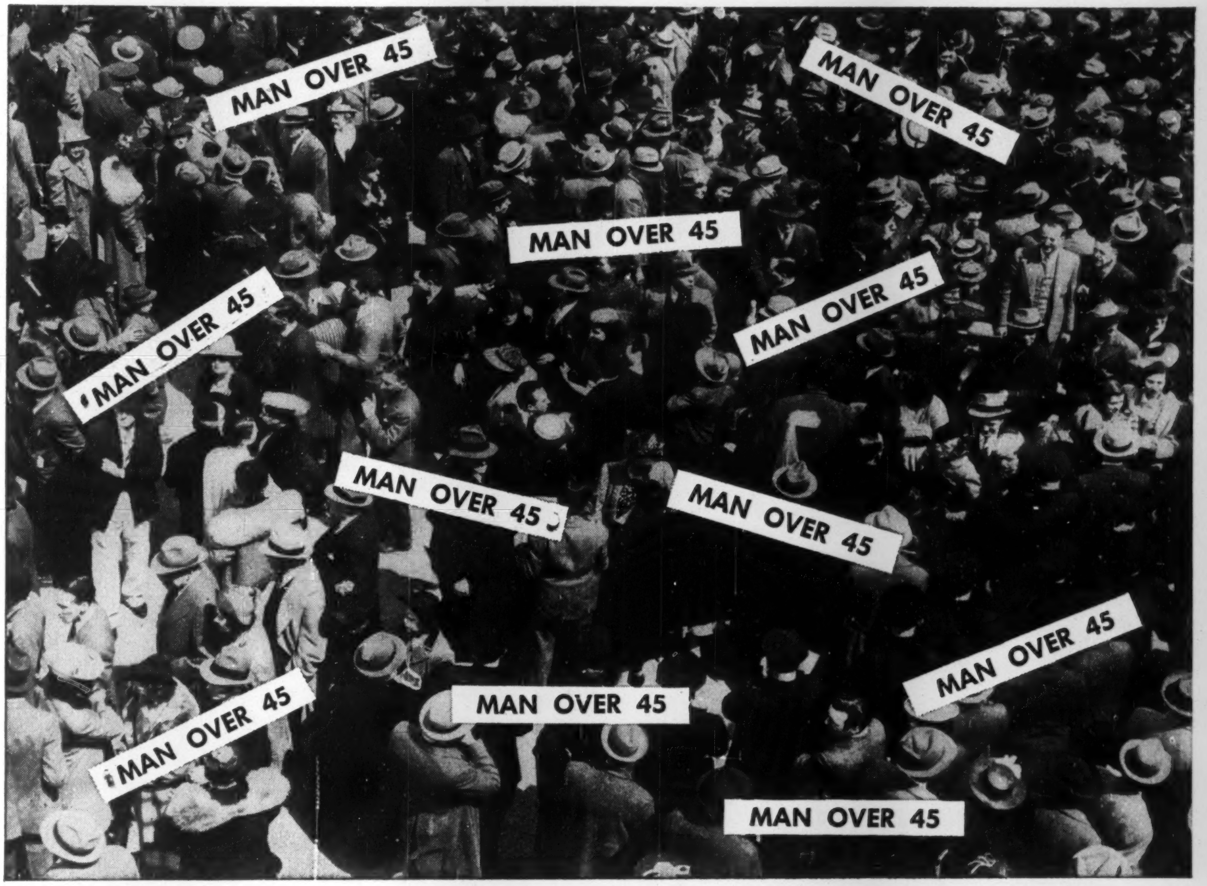
MAN OVER 45
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MAN OVER 45
MAN OVER 45

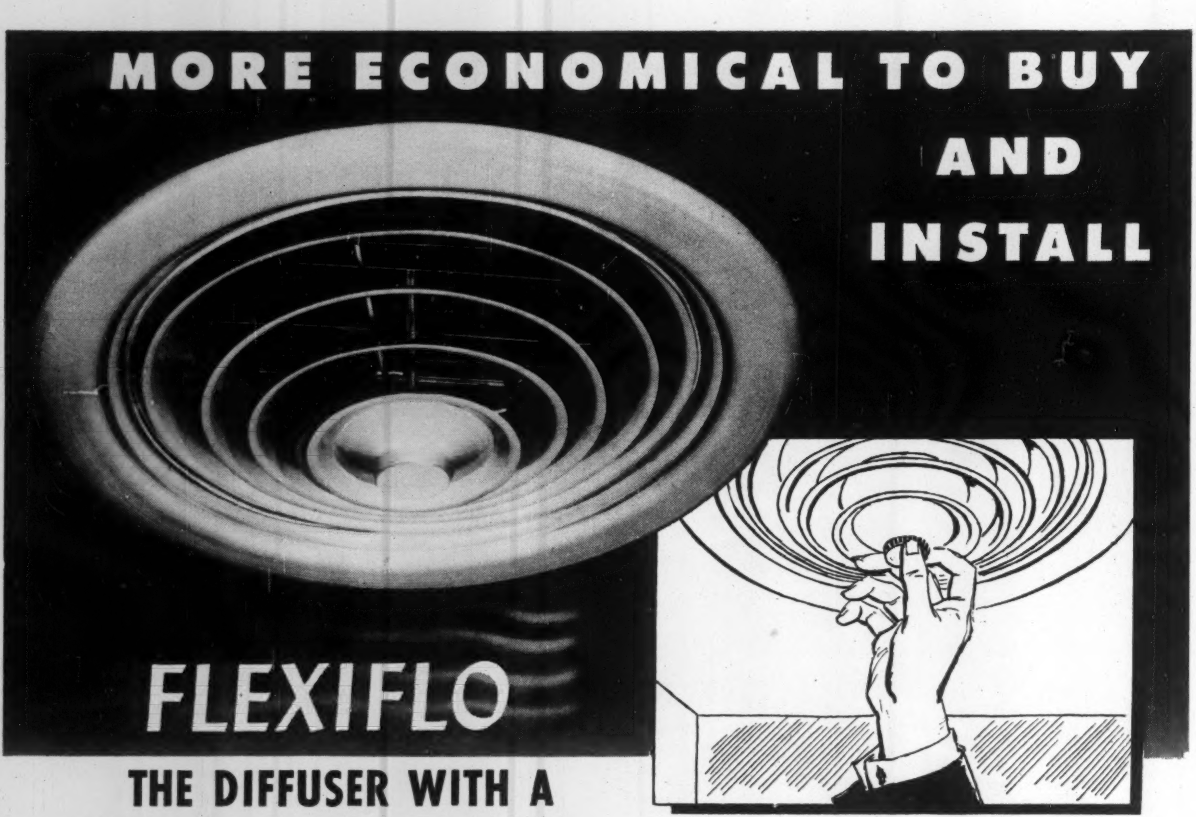
But why MEN over 45?

Our doctors still don't know *why*, but if you are a man over 45 you are six times as likely to develop lung cancer as a man of your age twenty years ago. They *do* know, however, that their chances of saving your life could be about *ten times* greater if they could only detect cancer long before you notice any symptom in yourself. (Only 1 in every 20 lung cancers is being cured today, largely because most cases progress too far before detected.) That's why we urge that you make a habit of having your chest X-rayed every six months, no matter how well you may *feel*. The alarming increase of lung cancer in men over 45 more than justifies such precautions. Far too many men die needlessly!

Our new film "The Warning Shadow" will tell you what every man should know about lung cancer. To see this film and to get life-saving facts about other forms of cancer, phone the American Cancer Society office nearest you or simply write to "Cancer"—in care of your local Post Office.

American Cancer Society

MORE ECONOMICAL TO BUY AND INSTALL



THE DIFFUSER WITH A BUILT-IN VOLUME CONTROL

Flexiflo adjustable air diffusers reduce installation costs by providing for rapid, easy adjustment of air volume *and* air pattern after installation.

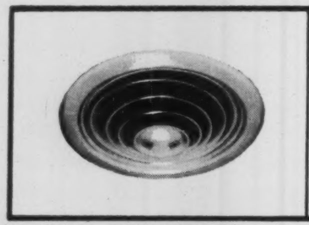
Not only the air volume but also the diffusion pattern is controlled by one knob. Just a half turn and the push-pull action changes the relative position of the blades, thus providing the desired results instantaneously. Because the system is so easily balanced, installation costs are reduced.

Engineering is also simplified, since the Flexiflo's wide range of adjustability minimizes the need for specifying exact performance characteristics.

Another advantage of the Flexiflo diffuser is its provision for uniform air distribution by means of *built-in equalizing deflectors* which are also easily adjustable after installation.

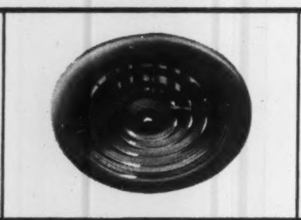
The result is a combination of draftless diffusion with efficient, trouble free operation.

A complete line of Flexiflo diffusers for every cooling, ventilating and heating need is made in 12-standard sizes, up to a capacity of 12,000 CFM.



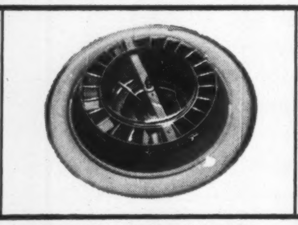
TYPE R — FOR COOLING

Air travels in a constant pattern parallel to the ceiling regardless of any adjustment in air volume.



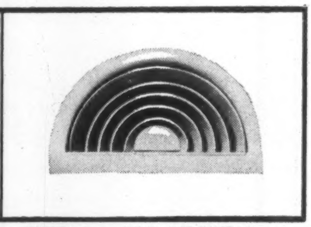
TYPE V — FOR COOLING AND HEATING

Air diffusion pattern and volume are fully adjustable, after installation, for any conditions, supplying air at any angle.



TYPE CH — FOR SUPPLY AND RETURN

A combination supply and return outlet made with either the type R or V blades. Fully adjustable.



TYPE S — FOR SIDEWALL AND CEILING

Provided with type R or V blades to blow air in desired pattern for ceiling or wall installation.

Write for the catalog containing complete technical data on the Flexiflo line of diffusers.

FLEXIFLO

UNIVERSAL DIFFUSER CORP.

1350 GARRISON AVENUE • NEW YORK 59, N. Y.

Tailored to fit the TIGHT spots!

AAF

NEW improved design

MULTI-DUTY FILTER now available in 3', 4' and 5 ft. Sections

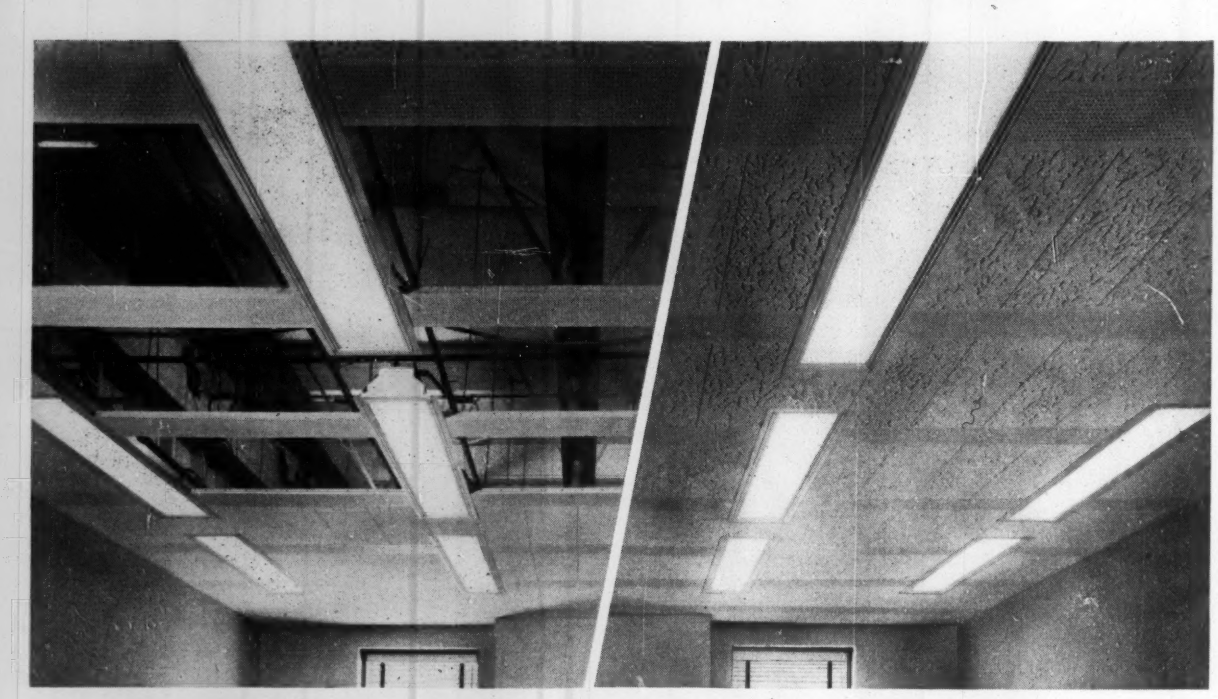
3'+3'+3'=9' and 4'+5'=9'. What's the difference? Plenty—costwise—it means you can install a 9-ft. wide filter with *two sections* instead of *three.* That's why the new Multi-Duty, with addition of the 5-ft. section, permits you to select the most economical combination of filter widths to fit a limited space.

And that's just a starter! New chain and sprocket design reduces over-all depth of the Multi-Duty by 5½ inches. Improved panel design features through rod suspension. More positive air seals eliminate possibility of oil seepage.

Greater versatility, lower installation costs, important space savings—you get them all with the new Multi-Duty. And what else? The proved performance and dependability of America's "most specified" automatic, self-cleaning air filter! Call your local AAF representative for complete product data, now, or write for Bulletin No. 241.

American Air Filter
COMPANY, INC.
373 Central Avenue, Louisville 8, Kentucky
American Air Filter of Canada, Ltd., Montreal, P. Q.

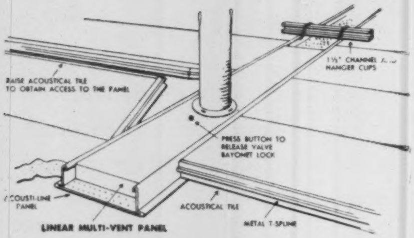
AAF



new! *Out-of-sight*

AIR DIFFUSERS for acoustical block ceilings!

Now Pyle-National Multi-Vent® air diffusing panels, adapted for concealed installation in Celotex Acousti-Line ceilings, provide advantages heretofore possible only with metal pan.


1½" CHANNEL AND HANGER CLIPS
RAISE ACOUSTICAL TILE TO OBTAIN ACCESS TO THE PANEL
PRESS BUTTON TO RELEASE VALVE BAYONET LOCK
ACOUSTI-LINE PANEL
ACOUSTICAL TILE
METAL T-SPLINE

LINEAR MULTI-VENT PANEL

The perforated face of Acousti-Line metal suspension panels act as diffusing plates for Multi-Vent units. No special supports are needed. Flexible connection minimizes need for accurate alignment between duct opening and Acousti-Line panels.

Note ready access to Multi-Vent unit for cleaning or valve adjustment.

NEW SMUDGE-FREE OPERATION—Multi-Vent's low velocity air delivery eliminates the dirtying or discoloration of adjacent acoustical blocks, a costly maintenance problem with high velocity diffusion.

NEW BEAUTY—Out-of-sight installation eliminates all protruding outlets and unsightly grilles. Permits complete freedom of interior design and decoration.

NEW LOWER INSTALLATION COST—Multi-Vent units can be assembled, connected to the duct, and seated in the metal suspension panels in just a few seconds. No tools are required . . . no cutting of blocks necessary.

AND, MOST IMPORTANT OF ALL—Air distribution by Multi-Vent's gentle pressure displacement assures perfectly even air motion and exceptional uniformity and control of room temperatures. The total absence of strong air streams or blow eliminates all usual sources of draft complaints and permits complete freedom in relocating partitions.

For complete information about Multi-Vent installations for all types of ceilings consult the Pyle-National Sales Engineer in your vicinity, or write direct.

MULTI-VENT DIVISION
Sales and Engineering Representatives in Principal Cities of United States and Canada

THE PYLE-NATIONAL COMPANY
1373 North Kostner Avenue
Chicago 51, Illinois

TURBO-GENERATORS • FLOODLIGHTS • PLUGS AND RECEPTACLES • CONDUIT FITTINGS

Once is not enough!

The need for blood is greater than ever, not only for men wounded in combat, but here at home . . . to cure disease, to meet accidents and disasters, and to prepare for civil defense.

Our quota can ONLY be met, if those who give *keep on* giving . . . regularly!

You CAN give more than once . . . as often as every three months with complete personal safety. The more often you give the more often you save a life. For every pint of blood you give goes to someone who needs it desperately.

Remember . . . once is NOT enough. Give blood again and again! Call your Red Cross, Armed Forces or Community Blood Donor Center for an appointment to give blood today.

GIVE BLOOD

...give it again and again

BUSINESS EXECUTIVES!

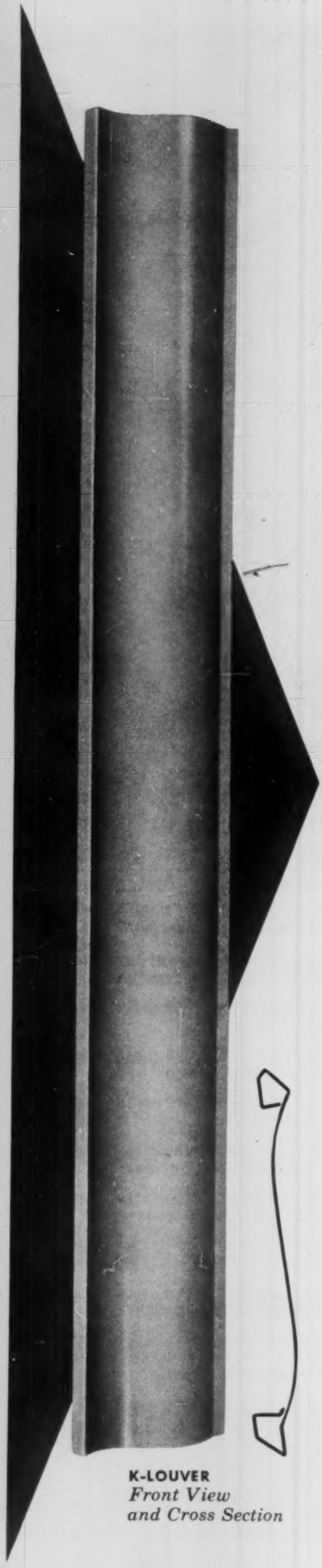
CHECK THESE QUESTIONS

If you can answer "yes" to most of them, you—and your company—are doing a needed job for the National Blood Program.

- ○ HAVE YOU GIVEN YOUR EMPLOYEES TIME OFF TO MAKE BLOOD DONATIONS?
- ○ HAS YOUR COMPANY GIVEN ANY RECOGNITION TO DONORS?
- ○ DO YOU HAVE A BLOOD DONOR HONOR ROLL IN YOUR COMPANY?
- ○ HAVE YOU ARRANGED TO HAVE A BLOODMOBILE MAKE REGULAR VISITS?
- ○ HAS YOUR MANAGEMENT ENDORSED THE LOCAL BLOOD DONOR PROGRAM?
- ○ HAVE YOU INFORMED EMPLOYEES OF YOUR COMPANY'S PLAN OF CO-OPERATION?
- ○ WAS THIS INFORMATION GIVEN THROUGH PLAN BULLETIN OR HOUSE MAGAZINE?
- ○ HAVE YOU CONDUCTED A DONOR PLEDGE CAMPAIGN IN YOUR COMPANY?
- ○ HAVE YOU SET UP A LIST OF VOLUNTEERS SO THAT EFFICIENT PLANS CAN BE MADE FOR SCHEDULING DONORS?

Remember, as long as a **single** pint of blood may mean the difference between life and death for **any** American . . . the need for blood is **urgent!**

NATIONAL BLOOD PROGRAM



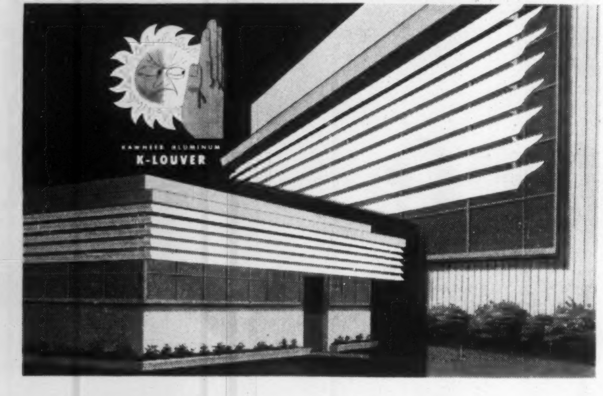
K-LOUVER
Front View
and Cross Section

Expand your air-conditioning business with

K-LOUVER

New, profitable sun control product by Kawneer

Permanent, "Built-in" louvers stop the sun heat load on windows


KAWNEER ALUMINUM
K-LOUVER

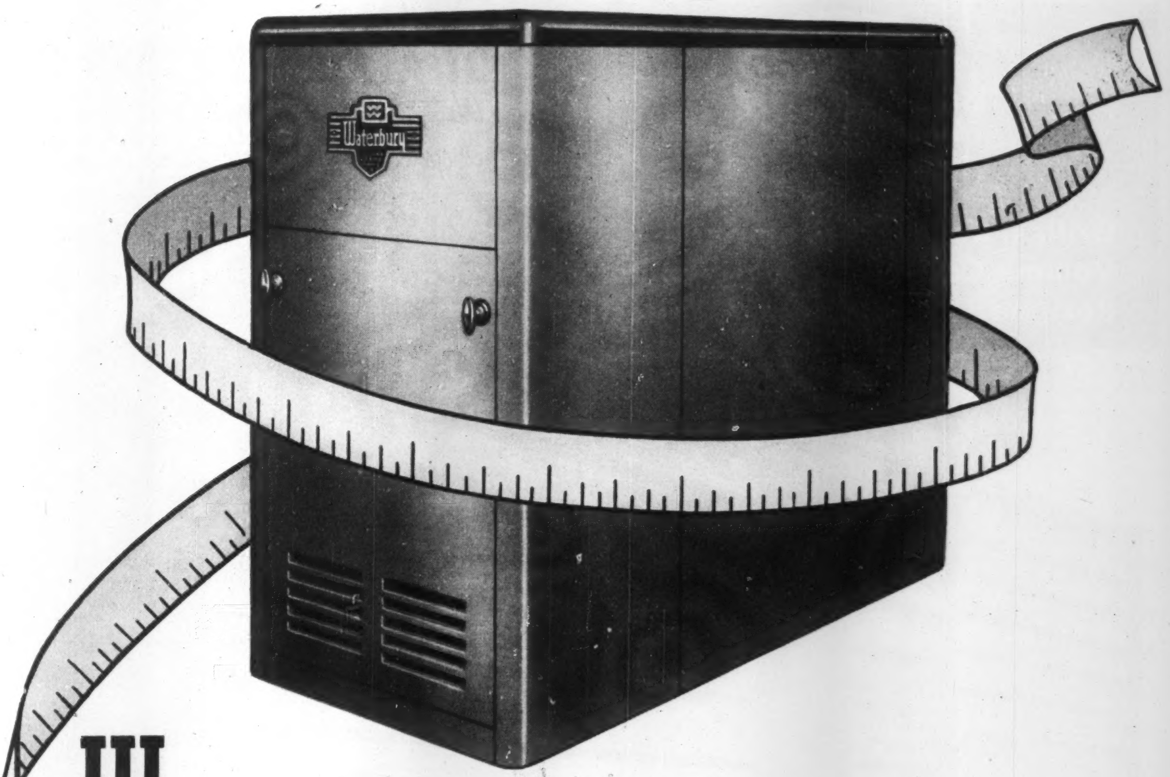
Aluminum K-Louvers offer an excellent opportunity for additional work and income. This amazing new product is designed to harmonize with architectural lines (the "Kawneer Touch"), to perform a highly efficient job of reducing the sun load on windows and control glare. It is presently being introduced to architects and engineers all over the country in the leading architectural publications and in person by the large Kawneer sales organization.

K-Louvers are a natural companion to air conditioning systems. They reduce operating and maintenance costs and in new installations cut the initial cost. Get into this profitable business now. Easy and quick on-the-job fabrication. Just write Kawneer, Niles, Michigan, to learn more about the K-Louver dealership.

NOW! "Built-in" sun control can enhance design
Control Ol' Sol with K-Louver
Kawneer sun control products
Kawneer sun control products

Store Fronts
Sun-Control Products
Doors and Entrances
Zourite Facing

Kawneer
NILES, MICHIGAN
Berkeley, Calif. · Lexington Ky. · Toronto, Can.



Waterbury . . . for good measure

FURNACES
WINTER AIR CONDITIONERS
GAS CONVERSION BURNERS

"A product is best judged by its quality. Manufacturer, distributor, dealer and consumer all know that quality above all else sells and satisfies."

Performance of product, as well as a sound dealer policy, are two reasons why more and more dealers are choosing Waterbury. That added measure of dependability plus the added measure of interest Waterbury has in its dealers, makes the Waterbury choice a good one.

Every Waterbury unit must meet the highest warm air heating standards, which means maximum efficiency, economy, and dependability from every Waterbury . . . satisfaction for customer and dealer alike.

The Waterman-Waterbury policy is clearly stated. It includes exclusive distribution rights, a close, personal relationship between dealers, distributors, and factory, and a complete line of quality equipment. Yes, dealers find that association with Waterbury is good business.

"It's what's under the casing that counts!"

The Waterman-Waterbury Co.
OVER 47 YEARS OF WARM AIR HEATING
1140 Jackson Street N. E.
Minneapolis 13, Minnesota

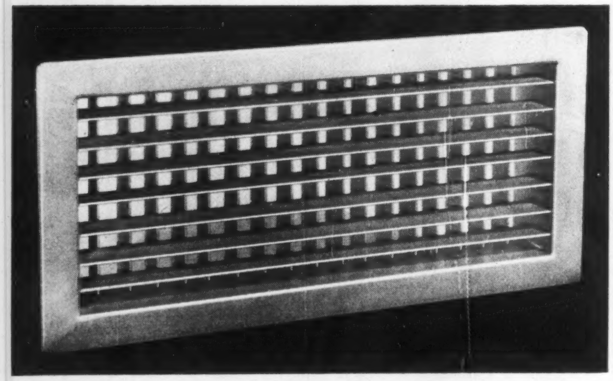
Waterloo
AIR DIFFUSION EQUIPMENT

A complete line of Grilles-Registers-Dampers-Volume Controllers-Door Ventilators, designed for Modern Architecture

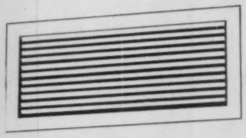
Waterloo's "Tear drop" fin design gives a quiet, smoother flow of air

Waterloo Air Diffusion Equipment was used by Arkansas Mechanical Contractors throughout the extensive heating and air conditioning system at St. Vincent Infirmary in Little Rock, Arkansas. 660 units - grilles, registers, dampers, and volume controllers - were installed.

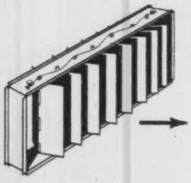
Brueggeman, Swaim & Allen and Erhart, Eichenbaum & Rauch, architects, chose Waterloo Diffusers because in addition to perfect air control and smooth, quiet operation, their custom-finished one-piece appearance definitely lent itself to the beauty of the modern interiors. St. Vincent Infirmary is another of today's modern structures in which time-proved Waterloo equipment has been incorporated to make sure that engineered air conditioning and heating installations perform at specified efficiencies. For further information about the complete Waterloo line of Air Diffusers, "the equipment that's seen but not heard", write to the factory for their complete catalog or for the name of your local Waterloo Representative.



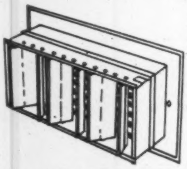
DOUBLE DEFLECTION GRILLE providing 4-way diffusion • each blade individually adjustable • front and rear "Tear Drop" fins pivot either way for complete close off.



FIXED RETURN AIR GRILLES



VOLUME CONTROLLERS



OPPOSED BLADE OR MULTI-SHUTTER DAMPERS

Waterloo
AIR DIFFUSION EQUIPMENT

WATERLOO SINCE 1902

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A practical manual on fume removal, dust collecting, ventilating and exhaust systems for industrial plants. Tells how to design correctly and provide for various ventilation requirements . . . make measurements and analyses of fumes, mists and dusts . . . plan exhaust systems, etc. Twenty eminent authorities contributed also to detailed descriptions of systems in actual operation in many plants. 134 pages, $1.50

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Single or Double Blade . . . for Square Elbows
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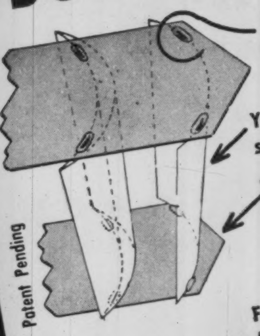

ONE hammer blow secures Blade with positive lock, rattle free
YOU make Blades of scrap. Cut square, no notching.
"DURO-VANE-RAIL" supplied in 8 foot lengths.

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Save money on Multi-blade DAMPERS
Make your Dampers with
"DURO BLADE KIT"
PRECISION-ENGINEERED
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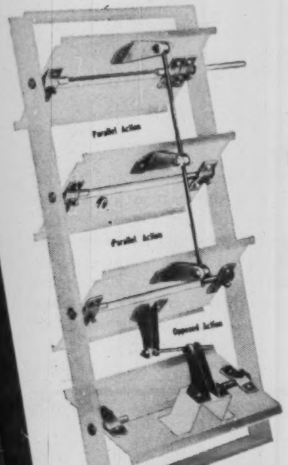


Note Parallel OR Opposed blade action
- Each blade quickly adjustable
- Tilting brackets line up automatically After Installation (can use inexperienced labor)

Write for Samples & Prices DEPT. 15

EQUIPMENT DEVELOPMENTS . . .

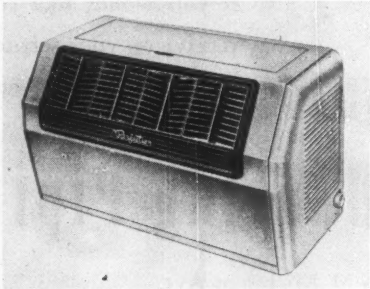
[Continued from page 286]

acting, reverse-acting and springless diaphragm motors. These are for operation of either double and single-seated straight-through bodies or for Venturi, three-way and low flow types of bodies.

Manufacturer—Minneapolis-Honeywell Regulator Co., Industrial Div., Wayne and Windrim Aves., Philadelphia 44.

Portable Window Air Conditioner

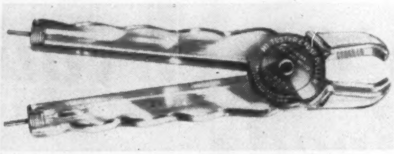
Company's first line of commercial room air conditioners includes a portable air conditioner utility cart to bring the unit to a permanently installed weather cabinet. . . . The unit slides into the cabinet in a bureau drawer motion. Thus, cabinets may be installed in every room and the air conditioning units are brought in only as they are needed. The year-round conditioners come in ½, ¾ and 1 hp capacities and all sizes fit into the cabinet. The entire unit is installed inside the window glass line.



Manufacturer—Perfection Stove Co., 7609 Platt Ave., Cleveland 4, Ohio.

Test Light and Fuse Puller

Test light and fuse puller for inserting or removing cartridge fuses, handling live electrical parts and testing circuits . . . The "Hi Tester and Fuse Puller" is made of transparent red "Tenite," a high dielectric plastic. Jaws are shaped to hold cartridge fuses up to 100 amp size. Inside surface of the jaws are serrated. Two 24-in. flexible leads are furnished. One lead has a 4-in. plastic handle prod, the other a spring clip with a rubber jacket. The test light is of the neon type with a resistor. When testing circuits, the light glows once on d-c and twice on a-c.

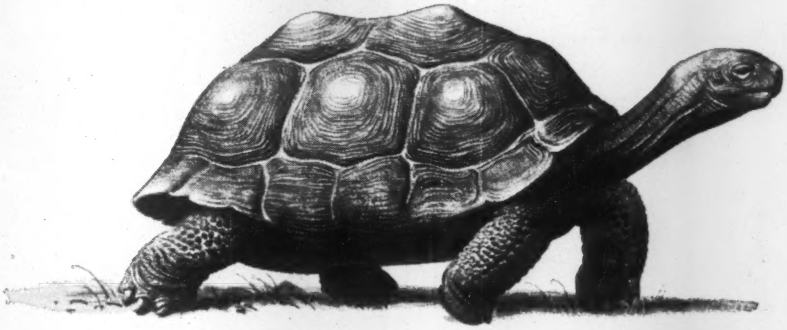


Manufacturer—Holub Industries, Inc., Sycamore, Ill.

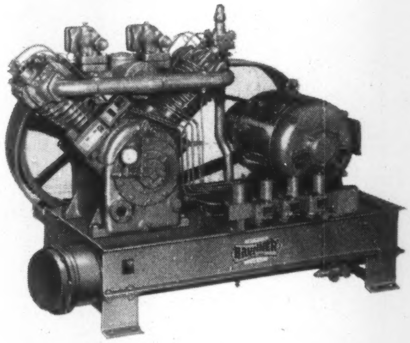
Unit Heater Construction Change

New type of construction on certain sizes of the manufacturer's "Utility" unit heater, a horizontal discharge heater, as well as on the suspended, vertical discharge revolving unit heater. . . . The feature of this construction lies in combining the motor mount with an integral safety guard. The result, it is claimed, is a

in air conditioning, too...



SLOW SPEED *means* LONG LIFE

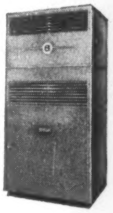


BRUNNER CONDENSING UNITS

—for remote installation in commercial and industrial air conditioning applications are available in sizes up to 75 H.P. Brunner Compressor Units for use with evaporative condensers also available up to 75 H.P.

SELF-CONTAINED AIR CONDITIONERS

—completely packaged, easy to install and operate, are supplied in various models in sizes 2 H.P. to 20 H.P.—for residential and commercial use.



Why does the turtle live so long?

From an engineering viewpoint, the answer would probably be "Slow Speed!" Because the speed with which things *move* has a vital effect upon their life and usefulness, the design engineer is *always* concerned with doing *more* work with *less* motion.

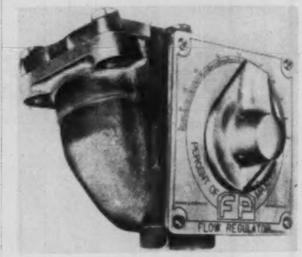
Famous BRUNNER slow-speed COMPRESSORS are good examples of this principle. Because they operate at speeds much slower than other compressors of the same capacities, Brunner Compressors deliver full capacity air conditioning with *less* costly motion—*less* wear on working parts, *less* maintenance required—and *lower* operating costs, too.

That's *one* good reason so many architects and consultants specify Brunner equipment on every air conditioning job—for utmost dependability, economy and long-range customer satisfaction. There are *other* reasons, too—so why not get the complete Brunner story? See your Brunner representative—or write us.

BRUNNER MANUFACTURING CO., Dept. L-14, UTICA, NEW YORK
The Brunner Co., Gainesville, Ga.
In Canada: Brunner Corp. (Canada) Limited, Toronto, Ontario

BRUNNER BRUNNER SINCE 1906 *means dependable* air conditioning more rigid type of motor mounting and more strength in the safety guard.

Manufacturer—L. J. Wing Co., 140 Vreeland Mills Rd., Linden, N.J.



Above: Regulator

Right: Heater

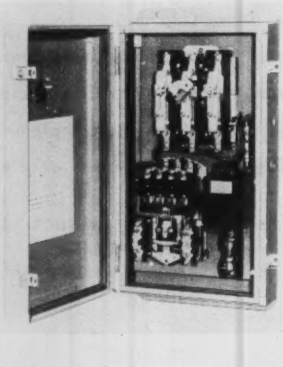
Automatic Flow Regulator

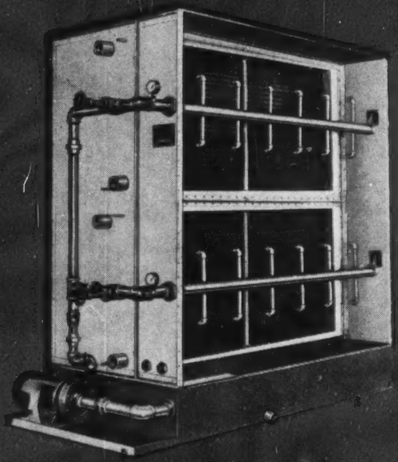
Automatic flow regulator which is self-operated. . . . The unit, which can be screwed directly into a pipeline, is designed to maintain a pre-set flow rate despite changes in upstream or downstream pressure. The manufacturer states that no outside source of energy is required and it is operated entirely by liquid passing through it. The ½. 1 and 2-in. sizes are said to handle flow ranges of 0.5-5, 1.0-15 and 6-80 gpm respectively. A percentage type scale is furnished as well as a specific gravity correction factor tag when liquids other than water are being metered. The controller, which operates by sensing differential pressure, maintains constant flow rate by maintaining constant pressure differential.

Manufacturer—Fischer & Porter Co., 17 Jacksonville Rd., Hatboro, Pa.

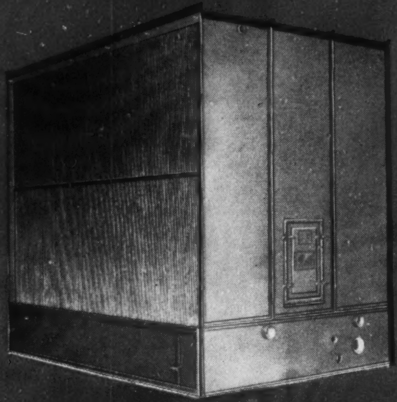
Combination Starters with Disconnect Switches

New line of a-c combination starters with disconnect switches designed and built in accordance with J.I.C. standards. . . . According to the manufacturer, they are intended for use wherever non-reversing magnetic across-the-line starters with disconnect means at the starter location are specified. Component parts include a magnetic full voltage starter, a dual voltage control transformer and pilot circuit fuse in combination with either a fusible or non-fusible disconnect switch. All parts are

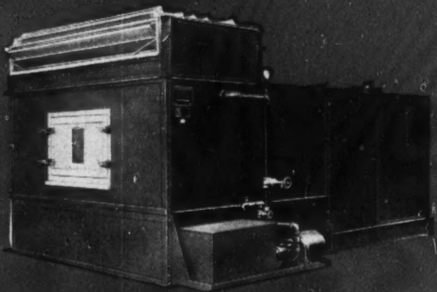




A&R TYPE VSC
SPRAYED COIL DEHUMIDIFIER



A&R FACTORY INSULATED
SPRAY TYPE AIR WASHER



A&R CAPILLARY® UNIT
CONDITIONER

A&R

AIR CONDITIONING EQUIPMENT

- Capillary® air washers
- Capillary® unit conditioners
- sprayed coil units
- control dampers
- insulated panels
- articulated units
- spray air washers
- special purpose dryers
- relief dampers
- rain louvers
- fire dampers

NOW READY TO SUPPLY
YOUR AIR CONDITIONING NEEDS
BETTER THAN EVER BEFORE

—CONSULT NEARBY SALES REPRESENTATIVE—

ALBUQUERQUE, N.M.
Air Equipment Co.
1607 N. 2nd St.

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305 Techwood Dr., N.W.

BOSTON, MASS.
J. M. Pettingell Assoc.
201 Devonshire Street

DALLAS, TEXAS
Harold O. Knape & Co.
3002 Commerce Street

DETROIT, MICH.
John J. Kramer & Assoc.
1110 McMillan

EL PASO, TEX.
Herlin Engineering Co.
600 West Paisano Drive

GREENVILLE, S.C.
Miller-Spann & Co.
218 McKoy St.

INDIANAPOLIS, IND.
Paller Engineering Co.
1037 No. Pennsylvania St.

LOS ANGELES, CALIF.
Hess, Greiner & Polland
1706 So. Main St.

MINNEAPOLIS, MINN.
R. H. McGinty Co.
515 Andrus Bldg.

NEW ORLEANS, LA.
W. C. Murphy & Assoc. Inc.
6270 General Diaz St.

NORFOLK, VA.
Ralph-Charles-Thomas Co.
819 Westover Ave.

PHOENIX, ARIZ.
Mr. J. S. Warren, Jr.
7218 No. 2nd St.

PORTLAND, ORE.
Harold W. McKenzie Co.
100 N.E. Holladay

SALT LAKE CITY, UTAH
Refrigeration Distrib. Corp.
132 So. 2nd West

SAN FRANCISCO, CALIF.
Fred W. Berger
57 Post Street

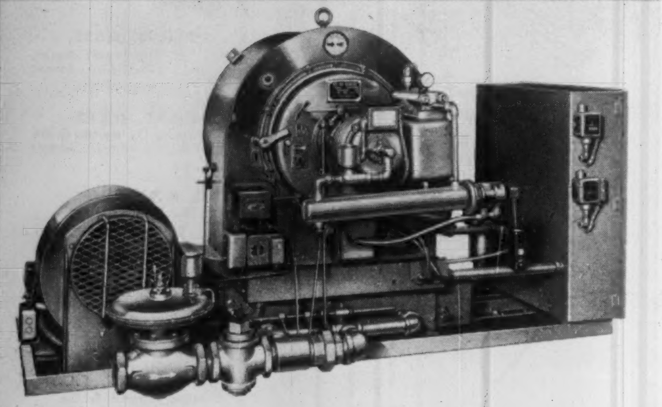
SEATTLE, WASH.
Karl H. Norby Co.
644 Skinner Bldg.

AIR & REFRIGERATION CORPORATION
439 MADISON AVENUE • NEW YORK 22, N. Y. ATLANTA, GA.

® Registered U.S. Patent Office

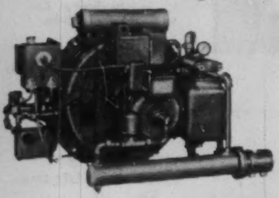
1st Again in 1953 RAY leads in sales*

*U. S. Dept. of Commerce figure

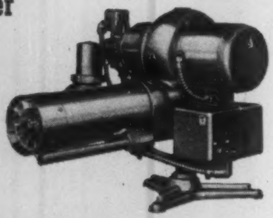


Forced draft packaged burner—Factory assembled for ready application to Scotch Marine Type boilers of proper design for fully automatic operation on oil, gas or combination gas-oil. 59 to 456 certified output H. P.

Horizontal rotary burner—Fully automatic for heavy or light oil, gas or combination gas-oil with gas-electric or straight oil ignition. ½ to 210 g.p.h. Semi-automatic and manual controlled burners up to 320 g.p.h.



Pressure atomizing burner Fully automatic for light oil, gas or combination gas-oil. 1 to 18 g.p.h. Constant or intermittent electric ignition 560,000 to 2,500,000 cu. ft. BTU gas.



A burner for every purpose—3 to 1000 horsepower ... firing light or heavy oil, gas or combination gas-oil ... fully automatic, semi-automatic or manual control. See the Ray dealer nearest you. Complete Ray dealer service is available everywhere.

For complete information send for the Ray condensed catalog today

RAY OIL BURNER CO.
Since 1872
1301 San Jose Avenue • San Francisco 12, California
Atlantic Seaboard Div. • 629 Grove St., Jersey City 2, N.J.
DISTRIBUTORS IN ALL PRINCIPAL CITIES OF THE WORLD

EQUIPMENT DEVELOPMENTS . . .

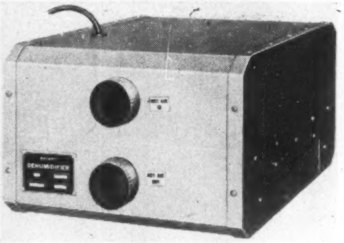
[*Continued*]

fastened to a removable steel panel mounted in a NEMA Type XII enclosure.

Manufacturer—Ward Leonard Electric Co., 24 South St., Mount Vernon, N.Y.

Adsorption Air Dryer

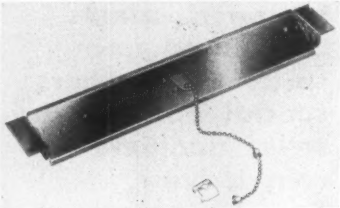
Adsorption air dryer to maintain a dry atmosphere in controlled small premises. . . . . The manufacturer states that the unit will reduce relative humidity in controlled areas from as high as 90 percent to 8 percent. The dryer is plugged directly into 115 volt electric circuits. It may be controlled by a standard humidistat, and requires no drains or other connections. In operation, it brings in outside air, dehumidifies it, and exhausts moisture laden air from inside. Damp air passes through a bed of silica gel, trapping moisture within the particles of gel. A small electric heater continuously regenerates the gel.



Manufacturer—Bryant Heater Div., Affiliated Gas Equipment, Inc., 17825 St. Clair Ave., Cleveland 10, Ohio.

Damper for Baseboard Diffuser

Separate damper for installation with the company's "NO. 180 Series" baseboard perimeter diffusers. . . . . The damper is designed to provide control of the air volume and to permit the system to be balanced at the diffuser face. Spring-loaded valves prevent the damper from closing accidentally. Valves are controlled by a chain operator which is held in place by a chain-lock disc attached to the front of the diffuser. A balancing bell permits the damper to be stopped at any open position. The damper fits either a 2¼ x 12-in., or 2¼ x 14-in. opening.



Manufacturer—Air Control Products, Inc., Coopersville, Mich.

Midget Solenoid Valve

Midget solenoid valve, no larger than two packs of cigarettes, designed for use with all types of gases and fluids. . . . The manufacturer states that the

COLE

INDUSTRIAL

DRAFT CONTROLS

FOR EVERY NEED — ANY SIZE — ANY SHAPE

Outperform and outlast

ORDINARY CONTROLS

COLE

STANDARD ROUND GATE CONTROL

with or without universal sleeve. Open check type. Perfectly counterbalanced. Ball bearing equipped. Stock sizes from 14" to 36". Prices start at $10.83. For top or side mounting. Special sizes on order.

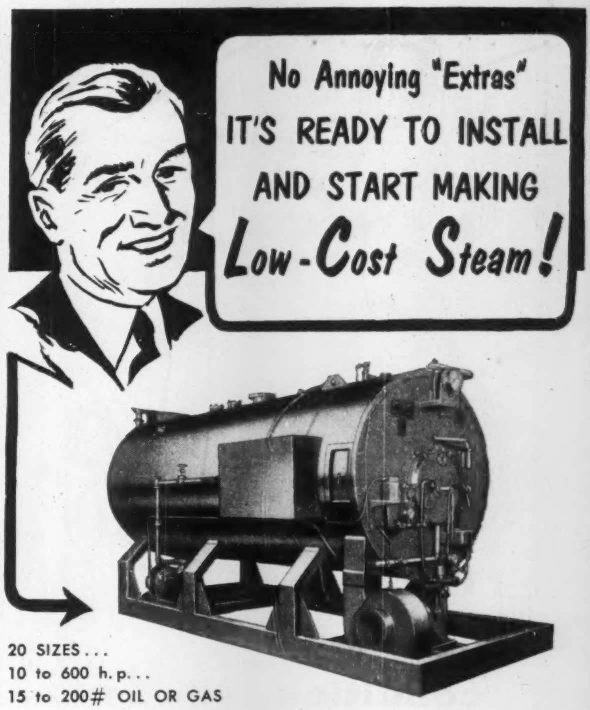
COLE

RECTANGULAR DAMPER CONTROL

Saves 10% to 30% on fuel. Internal damper type. Ball bearing equipped and counterbalanced in all positions. Large close fitting blades. All sizes and shapes, for any type breeching. Top or side mounting. Round stock sizes 14" to 36"

COLE-SEWELL ENGINEERING CO.

2288 UNIVERSITY AVENUE • ST. PAUL 14, MINNESOTA


No Annoying "Extras"
IT'S READY TO INSTALL AND START MAKING Low-Cost Steam!

20 SIZES...
10 to 600 h.p...
15 to 200# OIL OR GAS

AMESTEAM GENERATOR

This automatically controlled packaged boiler unit includes:

- ★ all piping and wiring, ready for your service connections.
- ★ fan, feed water pump, condensate tank, injector, blow-off valve, necessary refractories, insulation and metal jacket.

ALL YOU NEED is fuel tank, gas vent and service connections.

—AND YOU KEEP RIGHT ON SAVING with these trouble-free, fully automatic units with their eye-level controls, their accessibility inside and out, and fuel-saving 80% guaranteed efficiency!

AMESTEAM
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Builders of Better Boilers Since 1848

To solve any space condition, specify

AGITAIR

For correct air distribution to suit any space condition, AGITAIR square and rectangular diffusers have no equal. Custom-designed with built-in diffusing vanes, in a wide variety of louver patterns, they provide blows in 1, 2, 3 or 4 directions without use of blank-offs. AGITAIR diffusers need not be centrally located in the area to be served.

Advantages of AGITAIR'S exclusive air pattern control feature are greater design freedom for achitects and engineers, certified 100% draftless air distribution from any ceiling or sidewall location, maximum economy in duct runs.

New 34-page Type R Catalog reveals how correct air distribution is simplified by AGITAIR. Contact your local AGITAIR representative, or write us direct for your free copy.

AGITAIR®

AIR DEVICES INC.
185 Madison Avenue, New York 16, N. Y.

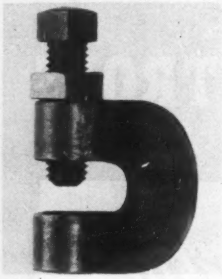
AIR DIFFUSERS · FILTERS · EXHAUSTERS

EQUIPMENT DEVELOPMENTS . . .

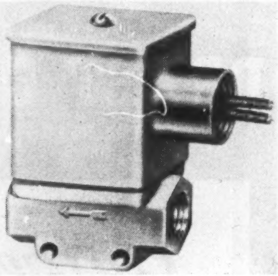
[*Continued*]

valves operate in any position and feature positive shut off, low current consumption, optional time delay and adjustable bypass and main flow. One model, the "K-28," is designed specifically for use in smaller oil burners. A built-in time delay action is said to prevent immediate opening of the valve until the oil burner motor gains full running speed. The "K-29" model is intended for use in both small and commercial oil burner installations. It is of the manual reset type.

Manufacturer—General Controls Co., 801 Allen Ave., Glendale 1, Calif.



Clamp



Valve

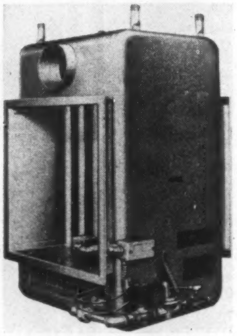
I-Beam Clamp for Piping

Adjustable, vibration-resistant I-beam clamp designed to handle requirements in process, food and chemical, utilities and steam piping systems. . . . The clamps are adjustable to various thicknesses of beams by means of a hardened set screw which clamps to the beam. A hex jam nut is used to lock the clamp and bolt to resist vibration. The clamp body, formed of 9-gage steel, is 2⅜ in. long by 2⅜ in. wide with a ¾ in. opening to receive a variety of flange sizes. The lower clamp jaw, threaded to receive hanger rods, is available in four sizes to take ⅜, ½, ⅝ and ¾-in. hanger rods.

Manufacturer—The Hupp Corp., 1250 W. 76th St., Cleveland 2, Ohio.

Gas Duct Heaters

Gas fired duct heater, featuring 12 models, ranging in input capacity from 65,000 to 500,000 Btu per hr. . . . The heaters are designed for heating and air tempering jobs where air is circulated by an independently located blower, especially when used in con-



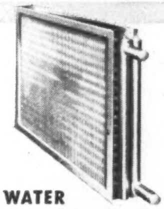
Drayer-Hanson EXTENDED SURFACE COILS are noted for their performance!

The key to performance is ample prime and secondary surface. Compare D-H coils with others!

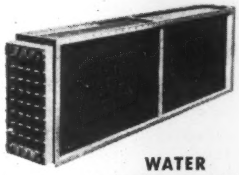
for heating or cooling using steam...water... or direct expansion!

STEAM
D-H Standard Type S
(Non-Freeze, Type NF also available)

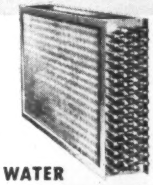
5 MODELS TO CHOOSE FROM



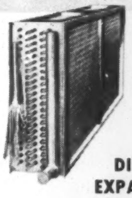
WATER
Continuous Tube, Type CT



WATER
Removable Header, Type RH



WATER
Removable Plug, Type OR



DIRECT EXPANSION
Type DX

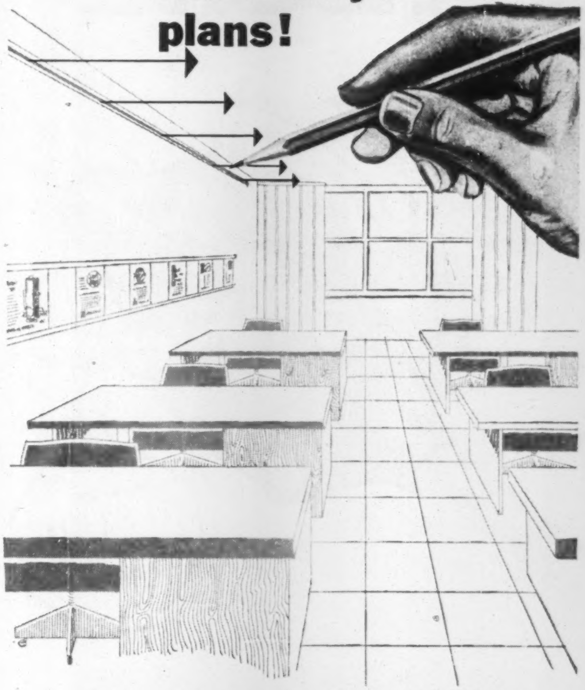
One of the nation's oldest coil manufacturers

drayer-hanson
INCORPORATED

SINCE 1910

3301 MEDFORD STREET, LOS ANGELES 63, CALIFORNIA

See how inconspicuously STRIPLINE fits into your plans!



Unlimited air distribution provided by slender continuous diffusers ...another AGITAIR first!

Stripline diffusers offer complete application versatility. They are ideal for installation in shallow lighting coves...window stools for air curtaining of glass windows or exposed wall areas...side of furred beams... or as a decorative border blanketing the entire area with noiseless, draftless air distribution. Custom built with AGITAIR's patented diffusing vanes, Stripline diffusers create maximum mixing and aspiration... quick temperature equalization and correct air distribution over any desired length.

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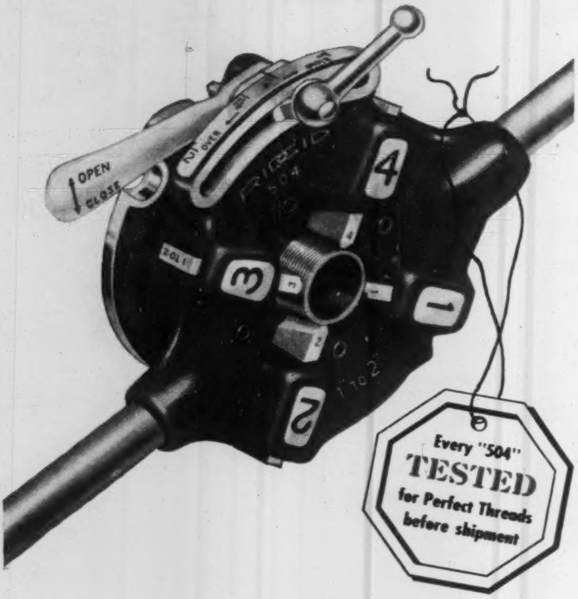
AIR DIFFUSERS • FILTERS • EXHAUSTERS

For Easiest Pipe Threading

... it's a "504"

RIDGID



1 Set of Dies
Threads 1" to 2" Pipe

- Instant change to 1", 1¼", 1½" or 2" pipe regardless of position of quick-opening lever.
- Wide open easy-to-read size bar . . . adjustable to over and undersize threads.
- Quick-opening lever retracts dies instantly without stopping power drive—no slow backing off.
- 4-jaw workholder centers pipe for accurate threading—no lead screw to jam.

For unmatched, easy, fast, clean threading with your power drive, buy precision-made RIDGID 504 at your Supply House.

THE RIDGE TOOL COMPANY • ELYRIA, OHIO

RIDGID
Work-Saver Pipe Tools

EQUIPMENT DEVELOPMENTS . . .

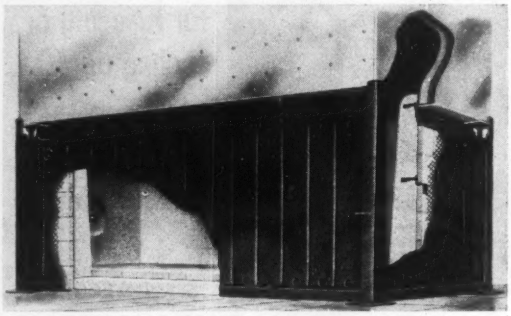
[Continued]

junction with air conditioning systems. A rectangular duct flange for connection to inlet and outlet ducts is standard equipment. A built-in diverter allows the unit to be installed 6 in. from the ceiling or walls. Controls can be wired to operate either simultaneously with the blower motor, so that the gas supply is turned on and off as the blower is started and stopped, or the unit may be controlled by a thermostat located in the leaving air side of the ductwork.

Manufacturer—United States Air Conditioning Corp., 3300 Como Ave., S.E., Minneapolis 14, Minn.

Boiler Base

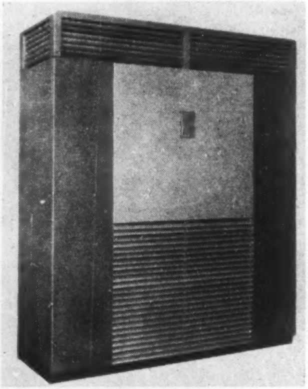
New base for waterleg type boilers, the "Inspecto Base". . . . The new base allows the under surface of the waterleg to be exposed at all times so that it can be inspected at any time. The company states that, being exposed, air can circulate about it freely preventing external corrosion due to moisture. According to the manufacturer, the shop fabricated base can be assembled by two men in less than an hour.



Manufacturer—The Plibrico Co., 1800 Kingsbury St., Chicago 14.

Packaged Air Conditioners

Manufacturer's 1954 line of packaged air conditioners featuring a sealed cooling system. . . . All component parts of the hermetic condensing unit, including the compressor, motor and condenser, are sealed in steel and lubricated. The entire system, which also includes cooling coil, drain pan and refrigerant piping, is



SPEED AND SIMPLIFY BORING
OF PIPE-SIZE HOLES IN WOOD
WITH GREENLEE PIPE BIT SET

Designed especially for plumbers, steamfitters and electricians to provide fast, easy boring of accurate holes in wood for ½″ to 2″ pipe and conduit. Makes swift, easy work of an otherwise tedious, hard job . . . assures clean "tailor made" openings for a neat job. The set is furnished in a sturdy, attractive metal box with convenient carrying handle. Bits have ½″ shanks for use in portable electric or pneumatic drills and in stationary boring machines. An adaptor is provided for standard auger bit braces. Adaptors are also furnished for using standard ⅜″ pipe as an extension for deeper boring and longer reach. Get facts today on these timesaving Greenlee tools.

TOOLS FOR CRAFTSMEN
GREENLEE
G

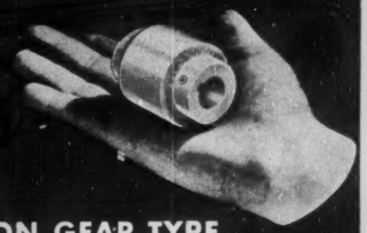
Greenlee timesaving tools for plumbing and heating work . . . Hydraulic Pipe Benders • Tubing Benders • Hydraulic Pipe Pushers • Pipe Bits • Auger Bits • Spiral Screwdrivers • Chisles and Many More. Write for details. Greenlee Tool Co., 2341 Twelfth Street, Rockford, Illinois.

WALDRON
built for long life
COUPLINGS

Their advanced design and exclusive construction features make them first choice of leading equipment builders. Your best insurance against costly shut-downs.

SERIES "A" GEAR TYPE

[illegible]



JUNIOR NYLON GEAR TYPE

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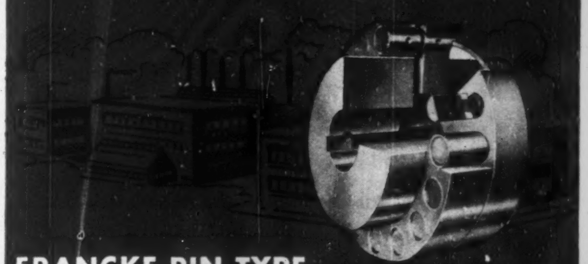


FRANCKE PIN TYPE

[illegible]

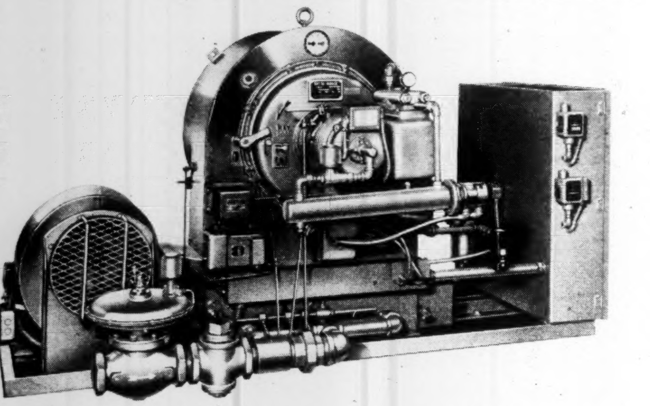
WALDRON couplings are [illegible]

JOHN WALDRON
CORPORATION
New Brunswick, N. J.
Since 1827

Sales Representatives In Principal Cities

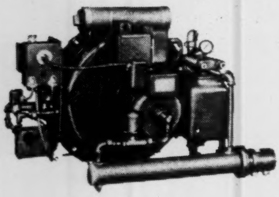
1st Again in 1953 RAY leads in sales*

*U. S. Dept. of Commerce figure

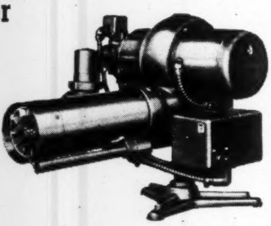


Forced draft packaged burner—Factory assembled for ready application to Scotch Marine Type boilers of proper design for fully automatic operation on oil, gas or combination gas-oil. 59 to 456 certified output H. P.

Horizontal rotary burner—Fully automatic for heavy or light oil, gas or combination gas-oil with gas-electric or straight oil ignition. ½ to 210 g.p.h. Semi-automatic and manual controlled burners up to 320 g.p.h.



Pressure atomizing burner
Fully automatic for light oil, gas or combination gas-oil. 1 to 18 g.p.h. Constant or intermittent electric ignition 560,000 to 2,500,000 cu. ft. BTU gas.



A burner for every purpose—3 to 1000 horsepower ... firing light or heavy oil, gas or combination gas-oil... fully automatic, semi-automatic or manual control. See the Ray dealer nearest you. Complete Ray dealer service is available everywhere.

For complete information send for the Ray condensed catalog today

RAY OIL BURNER CO.
Since 1872
1301 San Jose Avenue • San Francisco 12, California
Atlantic Seaboard Div. • 629 Grove St., Jersey City 2, N.J.
DISTRIBUTORS IN ALL PRINCIPAL CITIES OF THE WORLD

EQUIPMENT DEVELOPMENTS . . .

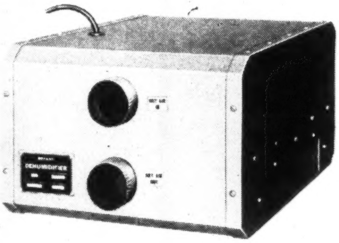
[*Continued*]

fastened to a removable steel panel mounted in a NEMA Type XII enclosure.

Manufacturer—Ward Leonard Electric Co., 24 South St., Mount Vernon, N.Y.

Adsorption Air Dryer

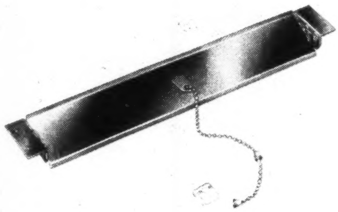
Adsorption air dryer to maintain a dry atmosphere in controlled small premises. . . . . The manufacturer states that the unit will reduce relative humidity in controlled areas from as high as 90 percent to 8 percent. The dryer is plugged directly into 115 volt electric circuits. It may be controlled by a standard humidistat and requires no drains or other connections. In operation, it brings in outside air, dehumidifies it, and exhausts moisture laden air from inside. Damp air passes through a bed of silica gel, trapping moisture within the particles of gel. A small electric heater continuously regenerates the gel.



Manufacturer—Bryant Heater Div., Affiliated Gas Equipment, Inc., 17825 St. Clair Ave., Cleveland 10, Ohio.

Damper for Baseboard Diffuser

Separate damper for installation with the company's "NO. 180 Series" baseboard perimeter diffusers. . . . . The damper is designed to provide control of the air volume and to permit the system to be balanced at the diffuser face. Spring-loaded valves prevent the damper from closing accidentally. Valves are controlled by a chain operator which is held in place by a chain-lock disc attached to the front of the diffuser. A balancing bell permits the damper to be stopped at any open position. The damper fits either a 2¼ x 12-in., or 2¼ x 14-in. opening.



Manufacturer—Air Control Products, Inc., Coopersville, Mich.

Midget Solenoid Valve

Midget solenoid valve, no larger than two packs of cigarettes, designed for use with all types of gases and fluids. . . . The manufacturer states that the

COLE

INDUSTRIAL
DRAFT CONTROLS
FOR EVERY NEED — ANY SIZE — ANY SHAPE

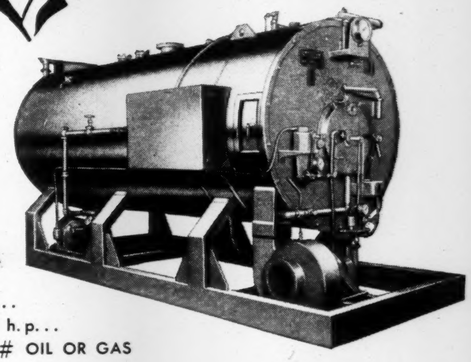
Outperform and outlast
ORDINARY CONTROLS

COLE
STANDARD ROUND GATE CONTROL
with or without universal sleeve. Open check type. Perfectly counterbalanced. Ball bearing equipped. Stock sizes from 14" to 36". Prices start at $10.83. For top or side mounting. Special sizes on order.

COLE
RECTANGULAR DAMPER CONTROL
Saves 10% to 30% on fuel. Internal damper type. Ball bearing equipped and counterbalanced in all positions. Large close fitting blades. All sizes and shapes, for any type breeching. Top or side mounting. Round stock sizes 14" to 36"

COLE-SEWELL ENGINEERING CO.
2288 UNIVERSITY AVENUE • ST. PAUL 14, MINNESOTA

No Annoying "Extras"
IT'S READY TO INSTALL
AND START MAKING
Low-Cost Steam!



20 SIZES . . .
10 to 600 h.p. . .
15 to 200# OIL OR GAS

AMESTEAM GENERATOR

This automatically controlled packaged boiler unit includes:

★ all piping and wiring, ready for your service connections.

★ fan, feed water pump, condensate tank, injector, blow-off valve, necessary refractories, insulation and metal jacket.

ALL YOU NEED is fuel tank, gas vent and service connections.

—AND YOU KEEP RIGHT ON SAVING with these trouble-free, fully automatic units with their eye-level controls, their accessibility inside and out, and fuel-saving 80% guaranteed efficiency!

FOR FACTS ON LOWER COST STEAM
WRITE FOR THIS FREE BULLETIN NOW!

NAME..........
COMPANY..........
ADDRESS..........
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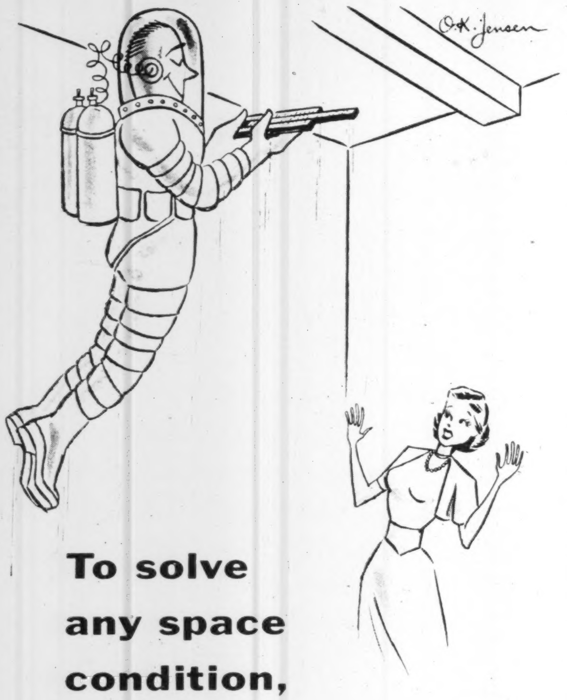
AMES IRON WORKS
BOX D-14 OSWEGO, N. Y.
Builders of Better Boilers Since 1848



To solve any space condition, specify

AGITAIR

For correct air distribution to suit any space condition, AGITAIR square and rectangular diffusers have no equal. Custom-designed with built-in diffusing vanes, in a wide variety of louver patterns, they provide blows in 1, 2, 3 or 4 directions without use of blank-offs. AGITAIR diffusers need not be centrally located in the area to be served.

Advantages of AGITAIR'S exclusive air pattern control feature are greater design freedom for achitects and engineers, certified 100% draftless air distribution from any ceiling or sidewall location, maximum economy in duct runs.

New 34-page Type R Catalog reveals how correct air distribution is simplified by AGITAIR. Contact your local AGITAIR representative, or write us direct for your free copy.

AGITAIR®
SQUARE AND RECTANGULAR AIR DIFFUSERS

AIR DEVICES INC.
185 Madison Avenue, New York 16, N. Y.

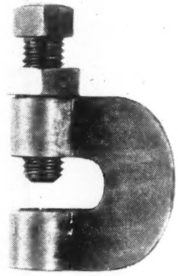
AIR DIFFUSERS • FILTERS • EXHAUSTERS

EQUIPMENT DEVELOPMENTS . . .

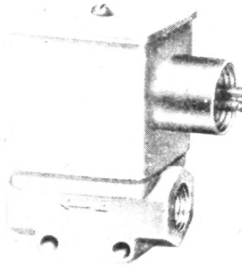
[*Continued*]

valves operate in any position and feature positive shut off, low current consumption, optional time delay and adjustable bypass and main flow. One model, the "K-28," is designed specifically for use in smaller oil burners. A built-in time delay action is said to prevent immediate opening of the valve until the oil burner motor gains full running speed. The "K-29" model is intended for use in both small and commercial oil burner installations. It is of the manual reset type.

Manufacturer—General Controls Co., 801 Allen Ave., Glendale 1, Calif.



Clamp



Valve

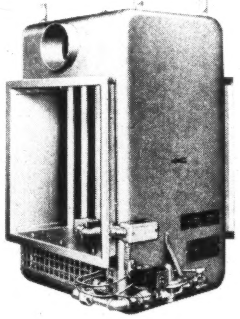
I-Beam Clamp for Piping

Adjustable, vibration-resistant I-beam clamp designed to handle requirements in process, food and chemical, utilities and steam piping systems. . . . The clamps are adjustable to various thicknesses of beams by means of a hardened set screw which clamps to the beam. A hex jam nut is used to lock the clamp and bolt to resist vibration. The clamp body, formed of 9-gage steel, is $2\frac{3}{8}$ in. long by $2\frac{3}{8}$ in. wide with a $\frac{3}{4}$ in. opening to receive a variety of flange sizes. The lower clamp jaw, threaded to receive hanger rods, is available in four sizes to take $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$ and $\frac{3}{4}$-in. hanger rods.

Manufacturer—The Hupp Corp., 1250 W. 76th St., Cleveland 2, Ohio.

Gas Duct Heaters

Gas fired duct heater, featuring 12 models, ranging in input capacity from 65,000 to 500,000 Btu per hr. . . . The heaters are designed for heating and air tempering jobs where air is circulated by an independently located blower, especially when used in con-

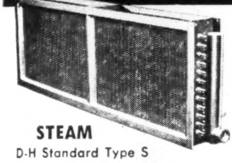


Drayer-Hanson EXTENDED SURFACE COILS are noted for their performance!

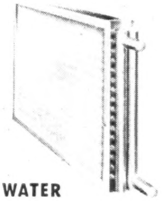
The key to performance is ample prime and secondary surface. Compare D-H coils with others!

for heating or cooling using steam...water... or direct expansion!

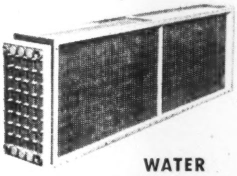
5 MODELS TO CHOOSE FROM



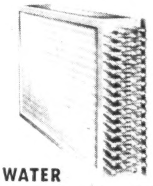
STEAM
D-H Standard Type S
(Non-Freeze, Type NF also available)



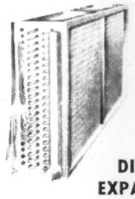
WATER
Continuous Tube, Type CT



WATER
Removable Header, Type RH



WATER
Removable Plug, Type OR



DIRECT EXPANSION
Type DX

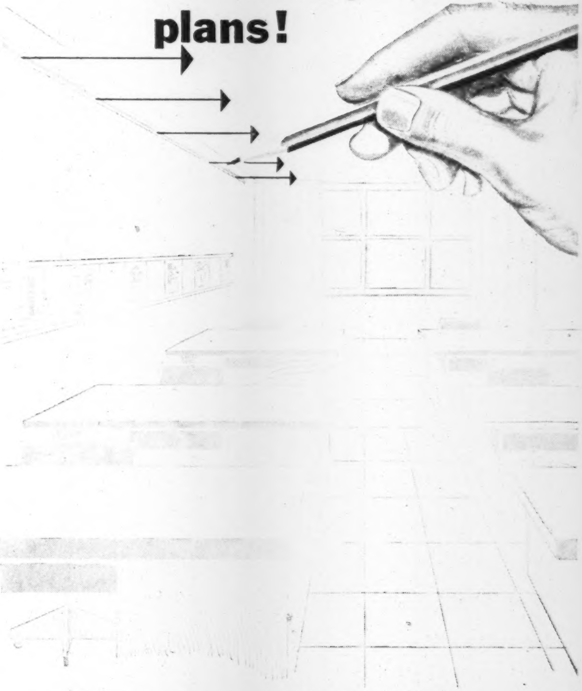
d-h
SINCE 1910

One of the nation's oldest coil manufacturers

drayer-hanson
INCORPORATED

3301 MEDFORD STREET, LOS ANGELES 63, CALIFORNIA

See how inconspicuously STRIPLINE fits into your plans!

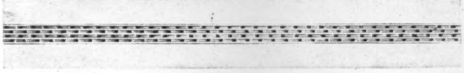


Unlimited air distribution provided by slender continuous diffusers ...another AGITAIR first!

Stripline diffusers offer complete application versatility. They are ideal for installation in shallow lighting coves...window stools for air curtaining of glass windows or exposed wall areas...side of furred beams... or as a decorative border blanketing the entire area with noiseless, draftless air distribution. Custom built with AGITAIR's patented diffusing vanes, Stripline diffusers create maximum mixing and aspiration... quick temperature equalization and correct air distribution over any desired length.

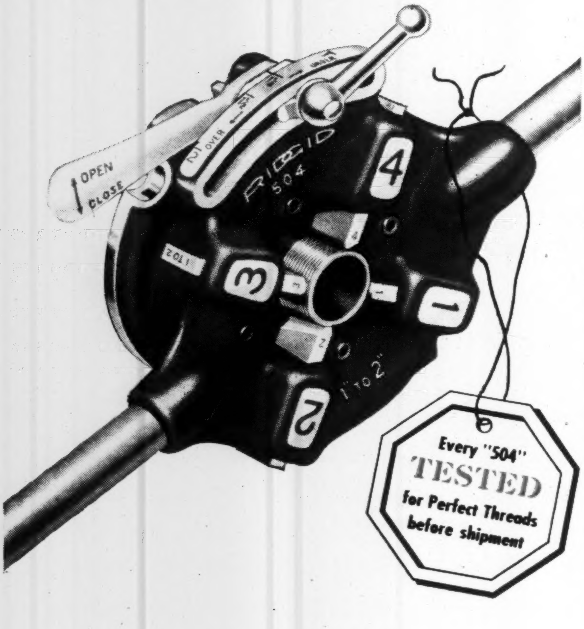
Write for your free copy of Catalog S-100 today.

AGITAIR STRIPLINE



AIR DEVICES INC.
185 Madison Avenue, New York 16, N. Y.
AIR DIFFUSERS • FILTERS • EXHAUSTERS

For Easiest Pipe Threading
... it's a "504"
RIDGID



1 Set of Dies
Threads 1" to 2" Pipe

- Instant change to 1", 1¼", 1½" or 2" pipe regardless of position of quick-opening lever.
- Wide open easy-to-read size bar . . . adjustable to over and undersize threads.
- Quick-opening lever retracts dies instantly without stopping power drive—no slow backing off.
- 4-jaw workholder centers pipe for accurate threading—no lead screw to jam.

For unmatched, easy, fast, clean threading with your power drive, buy precision-made RIDGID 504 at your Supply House.

THE RIDGE TOOL COMPANY • ELYRIA, OHIO

RIDGID
Work-Saver Pipe Tools

EQUIPMENT DEVELOPMENTS . . .

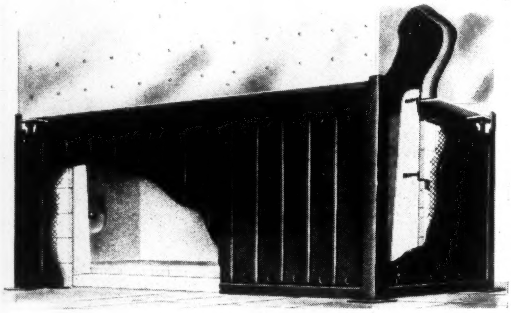
[Continued]

junction with air conditioning systems. A rectangular duct flange for connection to inlet and outlet ducts is standard equipment. A built-in diverter allows the unit to be installed 6 in. from the ceiling or walls. Controls can be wired to operate either simultaneously with the blower motor, so that the gas supply is turned on and off as the blower is started and stopped, or the unit may be controlled by a thermostat located in the leaving air side of the ductwork.

Manufacturer—United States Air Conditioning Corp., 3300 Como Ave., S.E., Minneapolis 14, Minn.

Boiler Base

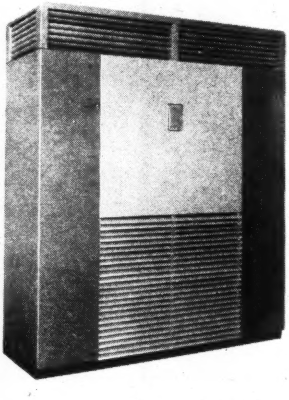
New base for waterleg type boilers, the "Inspecto Base". . . . The new base allows the under surface of the waterleg to be exposed at all times so that it can be inspected at any time. The company states that, being exposed, air can circulate about it freely preventing external corrosion due to moisture. According to the manufacturer, the shop fabricated base can be assembled by two men in less than an hour.



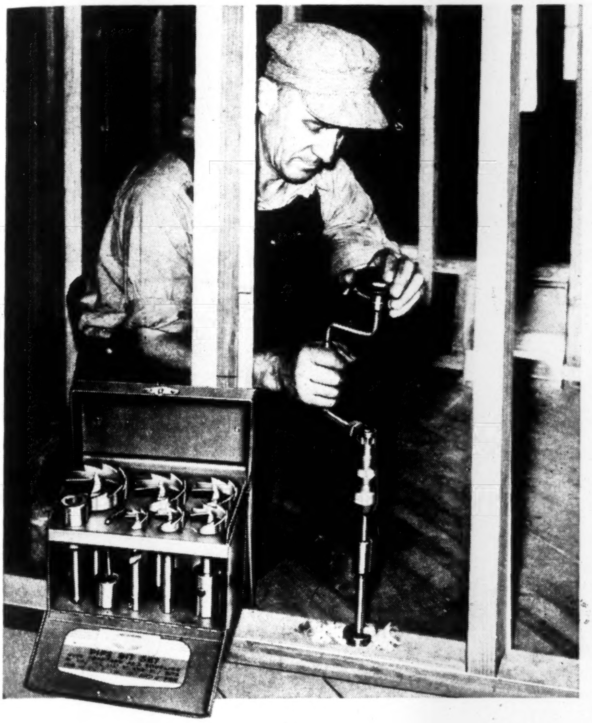
Manufacturer—The Plibrico Co., 1800 Kingsbury St., Chicago 14.

Packaged Air Conditioners

Manufacturer's 1954 line of packaged air conditioners featuring a sealed cooling system. . . . All component parts of the hermetic condensing unit, including the compressor, motor and condenser, are sealed in steel and lubricated. The entire system, which also includes cooling coil, drain pan and refrigerant piping, is



SPEED AND SIMPLIFY BORING
OF PIPE-SIZE HOLES IN WOOD
WITH GREENLEE PIPE BIT SET



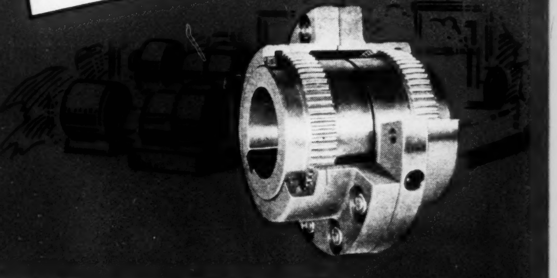
Designed especially for plumbers, steamfitters and electricians to provide fast, easy boring of accurate holes in wood for ½″ to 2″ pipe and conduit. Makes swift, easy work of an otherwise tedious, hard job . . . assures clean "tailor made" openings for a neat job. The set is furnished in a sturdy, attractive metal box with convenient carrying handle. Bits have ½″ shanks for use in portable electric or pneumatic drills and in stationary boring machines. An adaptor is provided for standard auger bit braces. Adaptors are also furnished for using standard ⅜″ pipe as an extension for deeper boring and longer reach. Get facts today on these timesaving GREENLEE tools.

TOOLS FOR CRAFTSMEN
GREENLEE

Greenlee timesaving tools for plumbing and heating work . . . Hydraulic Pipe Benders • Tubing Benders • Hydraulic Pipe Pushers • Pipe Bits • Auger Bits • Spiral Screwdrivers • Chisles and Many More. Write for details. Greenlee Tool Co., 2341 Twelfth Street, Rockford, Illinois.

WALDRON
built for long life
COUPLINGS

Their advanced design and exclusive construction features make them first choice of leading equipment builders. Your best insurance against costly shut-downs.



SERIES "A" GEAR TYPE

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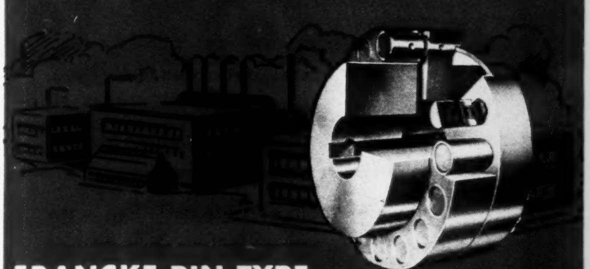
JUNIOR NYLON GEAR TYPE

[illegible]



FRANCKE PIN TYPE

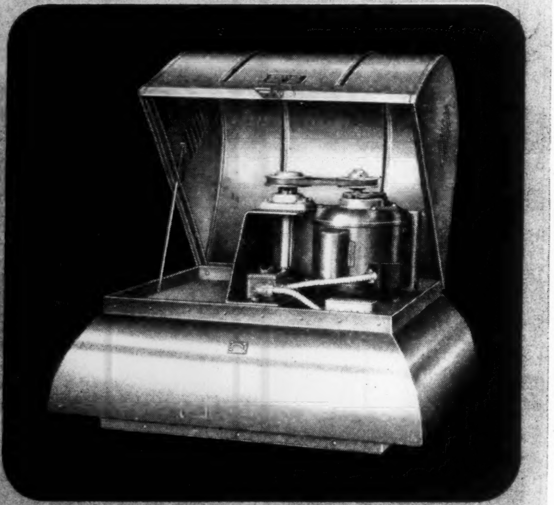
[illegible]

[illegible]

JOHN WALDRON
CORPORATION
New Brunswick, N. J.
Since 1827

Sales Representatives In Principal Cities

ALADDIN
Centrifugal
ROOF VENTILATORS



- THIRTEEN SIZES
- SELF CONTAINED
- QUIET OPERATING
- COMPLETE PERFORMANCE DATA

ALADDIN Centrifugal Roof Ventilators are furnished in thirteen sizes . . . direct and belt driven. Ruggedly built, these units have been designed especially for those installations where positive year around powered ventilation is required.

ALADDIN Roof Ventilators are described in the first complete engineering bulletin yet published on similar units. This bulletin contains full performance tables, characteristic curves and other data required for the proper selection of such equipment.

WRITE FOR BULLETIN 410

ALADDIN HEATING CORPORATION
1111 WEST AVENUE 137 • SAN LEANDRO, CALIF.
REPRESENTATIVES IN ALL PRINCIPAL CITIES IN THE WEST

EQUIPMENT DEVELOPMENTS . . .

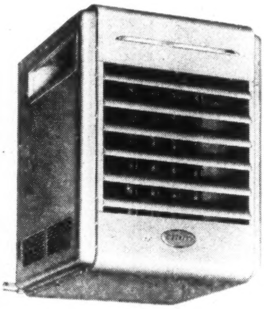
[Continued]

on a single frame that slides out. The compressor is spring-mounted inside the shell and the entire refrigeration machine is on rubber mountings. Models include 3, 5, 7½, 10 and 15-ton units. The three smallest units have vertical air intakes for in-space installations.

Manufacturer—General Electric Co., 5 Lawrence St., Bloomfield, N.J.

Suspended Gas Fired Heater

Automatic, 50,000 Btu gas fired unit heater. . . . Known at "Model 50 UF," it is 23 in. high and is engineered for suspension from the ceiling. According to the manufacturer, its low 24-volt control eliminates the necessity of running thermostat lines in conduit. A corrugated heat exchanger is porcelain coated for corrosion resistance. Heat direction is controlled by adjustable louvers. Summer switch provides air circulation for warm weather ventilation. The unit is AGA approved and may be used with natural, manufactured or liquefied petroleum gases.



Manufacturer—Automatic Heating Equipment Div. of Utility Appliance Corp., 4851 S. Alameda St., Los Angeles 58.

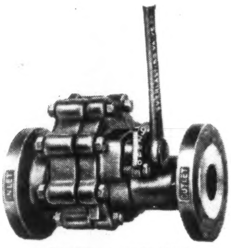
Mobile Air Conditioning Unit

Mobile air conditioning unit which does not require permanent fittings. . . . The entire unit, weighing less than 200 lb. rolls on rubber composition wheels. A squirrel cage fan is used. According to the manufacturer, it delivers 250 cfm. The company also states that water can be drawn from any water tap through a ⅜-in. flexible rubber tube.

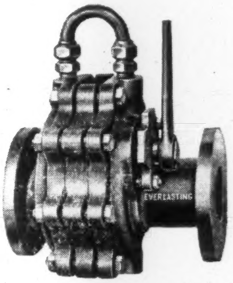
Manufacturer—Union Asbestos and Rubber Co., Heating and Cooling Div., 332 S. Michigan Ave., Chicago 4.

EVERLASTING® VALVES

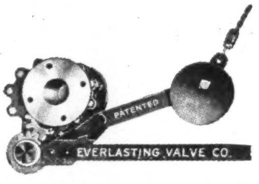
mean "Everlasting" Protection on these duties



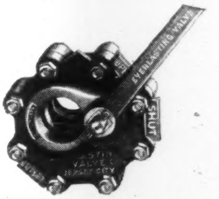
GENERAL SERVICE
Wherever frequent use and quick operation is required for any liquid or gas at pressures up to 300 psi. Have outside stuffing box and gland.



STEAM JACKETED
Assure continued free flow of any material which congeals at ordinary temperatures.



EMERGENCY PROTECTION
Closing type for inflammable liquid emergency shut-off, or opening type for deluge or drainage, assuring immediate and positive action with weighted pendulum stop.



BOILER BLOW-OFF
Quick-opening, also handwheel operated Angle and "Y" types and combination units meeting ASME Code requirements for pressures up to 600 psi.

For more than 40 years, EVERLASTING VALVES have been known for their ingenious design, simple sturdy construction, and long trouble-free life with low maintenance expense. Some of their distinctive features are:

Quick-Action . . . opened or closed with less than a quarter turn of the operating lever.

Straight-Through Flow . . . the disc cannot become loose and accidentally check the flow.

Drop-Tight Seal . . . constant contact of disc and seat at all times prevents dirt or scale from getting between.

Self Regrinding . . . the disc rotates on the seat with each operation, thus regrinding the sealing surfaces.

No Wedge Action . . . all parts move between parallel faces.

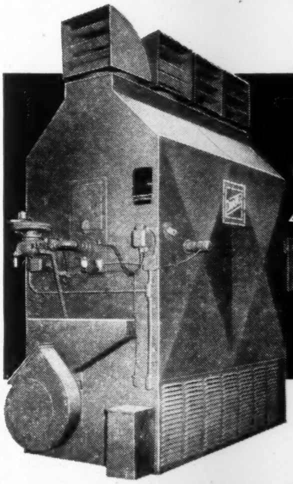
Write for bulletin describing EVERLASTING VALVES in detail.

Trade-Mark "Everlasting" Reg. U.S. Pat. Off.

EVERLASTING VALVE COMPANY

61 FISK STREET, JERSEY CITY 5, N. J.

Announcing DRAVO'S COMPLETE LINE OF HEATERS



THE DRAVO *Counterflo . . .*
40 Models
400,000 to 2,000,000 Btu/hr output
For large commercial and industrial buildings

THE DRAVO *Paraflo . . .*
4 Models
200,000 to 250,000 Btu/hr output
For smaller industrial or commercial buildings

THE DRAVO *Gas Fired* UNIT HEATER . . .
68,000 to 172,000 Btu/hr output
10 Models
For stores, service stations and other small buildings

ALL DRAVO HEATERS have automatic temperature control and a minimum efficiency of 80% . . . require no ductwork . . . are ideal for heating in the winter, ventilation in the summer and for process drying.

DRAVO
CORPORATION
Sales Representatives in Principal Cities

Send the coupon for complete information

DRAVO

DRAVO CORPORATION, Heating Department
Fifth and Liberty Avenues, Pittsburgh 22, Penna.

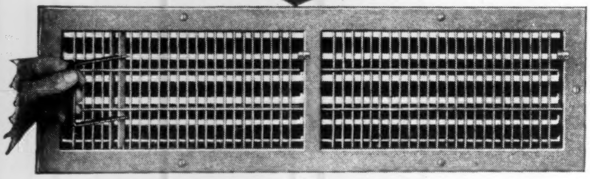
Please send me complete information about the Dravo:
☐ **Counterflo Space Heater** ☐ **Paraflo Space Heater**
☐ **Gas Fired Unit Heater**
☐ Please have a representative call at no obligation to me.
Ask for Bulletin EF 598-4657.

Name________________ Title________
Company________________
Address________________
City________________ Zone______ State________

INDEPENDENT

"Fabrikated"
REG. U. S. PAT. OFFICE

AIR CONDITIONING REGISTERS



No. 321-A HMV Tandem

Each front grille bar may be adjusted individually. As a result, the angles of deflection or combinations of grille bar adjustment are unlimited. These adjustments may be made when register is installed or at any later time desired. The valves in Independent HMV registers are readily set by a lever control located on the front to direct the air up or down, or the valves may be fully closed. Available in a number of small and large sizes.

We take this opportunity to thank our jobbers, installers and contractors for their patronage over the past years. The good will and support of our many friends and customers have made possible the continuance of our slogan "Always Leading, Always Progressing."

Prompt service is our motto. There's no order too small for our special attention.

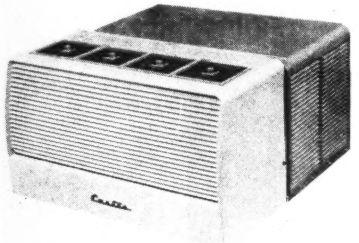
THE INDEPENDENT
REGISTER CO.
3747 E. 93rd STREET • CLEVELAND, OHIO

EQUIPMENT DEVELOPMENTS . . .

[*Continued*]

Room Air Conditioner

New 1954 room air conditioner. . . . Mechanical improvements feature extra large coils with more fins per in. to increase its cooling and dehumidifying capacity. The hydrolene base is said to eliminate sweating. The "Fiberglas" insulated bulkhead is designed to reduce the noise factor.

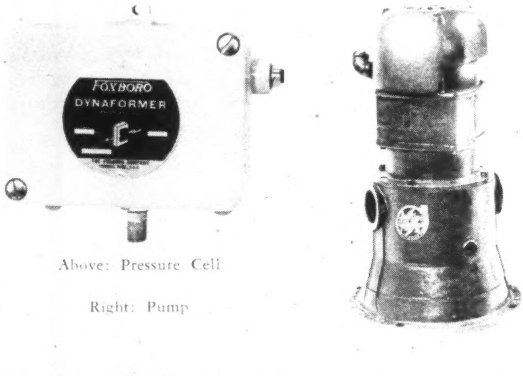


Manufacturer—Refrigeration Div. of Curtis Mfg. Co., 1950 Kienlen Ave., St. Louis 20, Mo.

Vertical Pumps

Manufacturer has extended its line of vertical self-priming pumps up to 1½ hp. . . . With the addition of nine new verticals, the line now includes 23 models with capacities up to 120 gpm. The "Diffuser Design" is said to enable the pumps to prime and purge themselves automatically even on suction lifts. A self-lubricating shaft seal is said to eliminate drip, and reduce maintenance. The pumps are available in 1½ in. and 2 in. sizes, with 1/3 to 1½ hp. single or three phase, open or explosion proof motors.

Manufacturer—Marlow Pumps, Subsidiary of Bell & Gossett Co., Ridgewood, N.J.

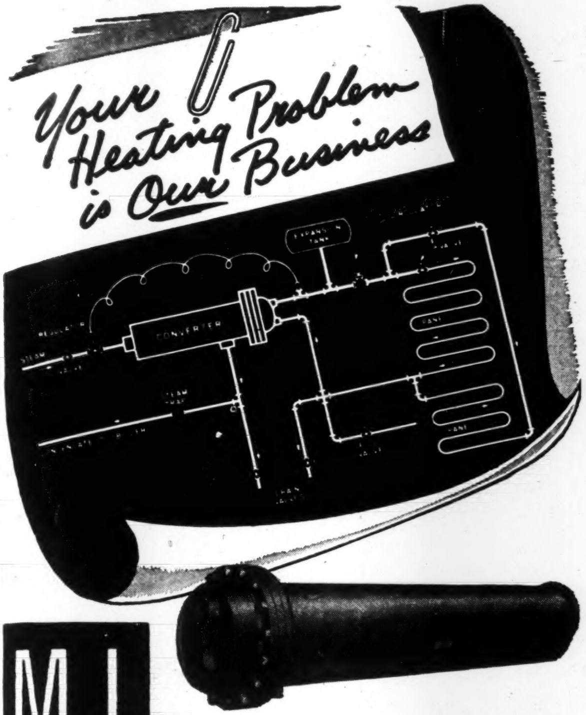


Above: Pressure Cell

Right: Pump

Pressure Cell for Controls

A new transducer, the "Dynaformer" pressure cell. . . . The element is designed to convert fluid pressure into a proportional a-c voltage which is measured in terms of pressure by the manufacturer's electronic resistance "Dynalog" instrument. The cell consists of a Bourdon pressure spring linked to a copper ring which surrounds the iron core of a differential transformer. Responding to fluid pressure, the spring positions the ring, inducing a differential voltage in the output wind-



M&L ...Traditionally the right equipment for every Water Heating purpose

When your plans include heating water with live or exhaust steam—when they call for hot water supply to radiant heating panels or other hot water systems—then use M & L equipment.

There are many reasons why M & L equipment is traditionally selected for dependable, uninterrupted service—one of which is the extreme care exercised in assembling, to insure longer service life.

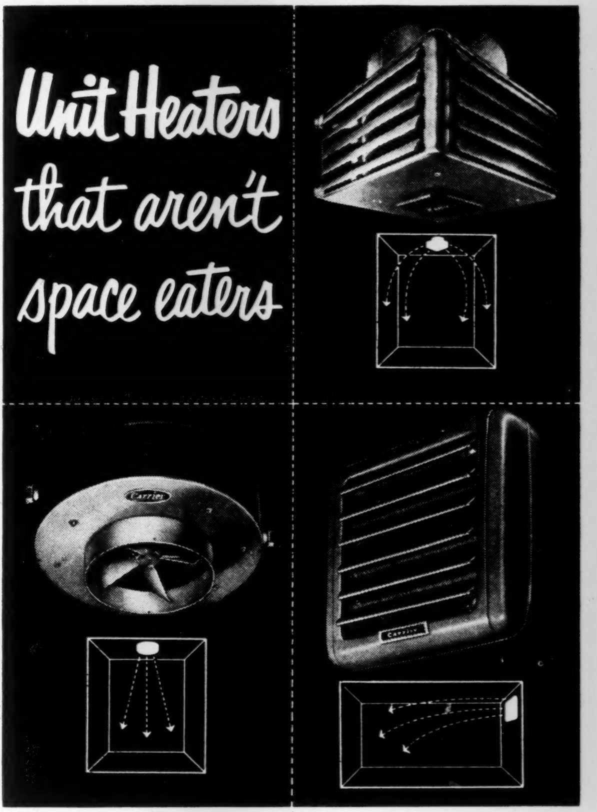
Standardized Flexibility

The unique M & L method of fabrication, which permits custom-built equipment to be made from standardized components at a substantial saving in first cost—fits the equipment to the job to be done.

Send for more details on this worthwhile economy. Please include complete operating conditions in your inquiry to receive an accurate, individual proposal.

1954

Manning & Lewis
Engineering Co.
32 Ogden Street Newark 4, New Jersey
SALES REPRESENTATIVES IN PRINCIPAL CITIES
M&L



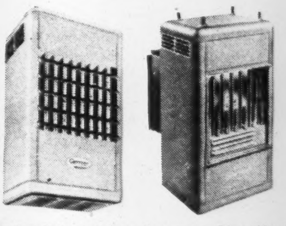
Not only are Carrier Unit Heaters for steam and hot water designed for out-of-the-way installation, but compactness enables them to take up little space anywhere. Efficiency, styling, controls and dependability reflect Carrier's high-class engineering. Quality materials and sturdy, long-lasting construction are evidence of conscientious manufacture.

CARRIER Four-way Directed-flo Unit Heater (top). Through independently controlled warmed air streams from four easily adjusted outlets, and from heights up to 30 feet, this unit provides quick heat *in any direction, at any angle, in any capacity* within the respective ranges of its seven sizes—82,000 to 500,000 Btu per hour.

CARRIER Projection Unit Heater (lower left). This single discharge high ceiling type unit with wide selection of outlet diffusers is available in seven sizes and a choice of coils for low or standard temperature rise. Capacities from 32,000 to 492,000 Btu per hour.

CARRIER Propeller-fan Horizontal Air Discharge Unit Heater (lower right) delivers warmed air horizontally through adjustable discharge louvres in any capacity within the respective ranges of its ten sizes of 21,000 to 200,000 Btu per hour.

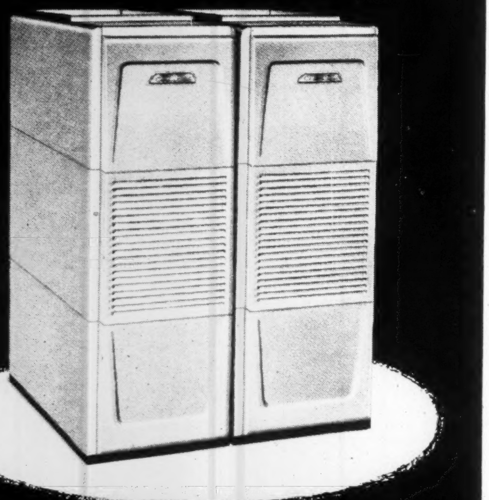
CARRIER Gas-fired Unit Heaters are AGA-approved for all gases. Duct type at right. Propeller-fan type at left (made also in smaller design for lower ceiling heights). Solidly built—featuring exclusively *16*-gauge ALUMINIZED STEEL heat exchanger. Capacities range from 50,000 to 230,000 Btu per hour input.



For further information, WRITE Carrier Corporation, Syracuse, New York.

Carrier
AIR CONDITIONING
REFRIGERATION
INDUSTRIAL HEATING

Years ahead!
Compact "package" lets you install
tomorrow's comfort today



Mueller Climatrol

NEW COMPANION UNITS

BRING YOU ADDED BUSINESS NOW – ON YEAR-AROUND HEATING AND COOLING

Once again, Mueller Climatrol has responded to your needs. The new companion winter-heating and summer-cooling units permit you to sell the *right size* in both heating and cooling units, irrespective of climates.

The heating unit shown at left above is available in four sizes — 80,000, 100,000, 120,000 and 150,000 Btu input. The type 906 cooling unit, at right above, is available in 2-hp and 3-hp sizes. Each size of the heating unit may be interchanged with either of the cooling models — thus giving you real flexibility.

You can offer prospects the last word in comfort with new Mueller Climatrol engineering — new efficiency . . . new, attractive styling . . . new, handsome Mountain Spring Green finish.

You can talk cleaner living . . . better health . . . more convenience . . . less depreciation . . . greater comfort.

Send coupon for further information on why you can count on Mueller Climatrol companion units to turn more prospects into buyers.

MUELLER CLIMATROL, INC.
2023Z W. Oklahoma Ave., Milwaukee 15, Wisconsin
Send me further information on
the new Mueller Climatrol companion units..

Name....................

Address....................

City....................(........) State....................

D-158

Mueller Climatrol

EQUIPMENT DEVELOPMENTS . . .

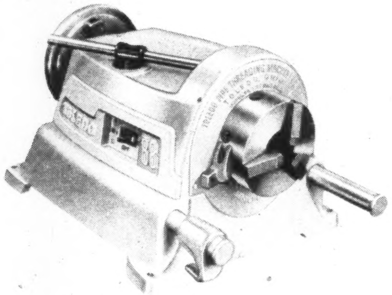
[*Continued*]

ing proportional to the fluid pressure. A self-contained adjustment enables the user to match the zero of the transducer to that of the instrument. Pressure ranges between 0 to 30 in. Hg and 0 to 10,000 psi are available.

Manufacturer—The Foxboro Co., Foxboro, Mass.

Power Drive for Hand Pipe Tools

New "88" power drive for operation of hand pipe threaders, cutters and reamers. . . . It has a capacity of 1/8-in. to 2-in. pipe, 1/4 in. to 1½-in. bolts, with universal drive shaft, geared die stocks and cutters up to 12 in. Design features include a 3-jaw scroll chuck on the front with six pinions, rear chuck and universal centering. The reducing gears are sealed. The manufacturer states that occasional lubrication is required for the steel-backed bronze bushings on the spindle. A chuck wrench ejector is located on each side. The aluminum housing has resulted in a weight reduction of the drive to 140 lb.



Manufacturer—Toledo Pipe Threading Machine Co., 1115 Summit St., Toledo 4, Ohio.

Adjustable V-Belt for Drives

"Veelos" adjustable v-belt for D and E drives. . . . Known as "TD" and "TE" link v-belts, they are made of treated high tensile strength canvas duck, joined by riveted studs with removable cup-washers and T-screws. According to the manufacturer, this construction gives strength and durability at all key points yet enables the belts to be coupled and uncoupled easily. Two types are available, regular rubber coated for general services and oil-proof for oily and high temperature drives. Applications include industrial air conditioning units, compressors, fans and blowers.

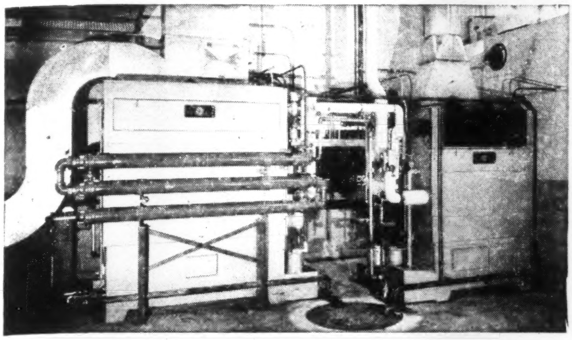
Manufacturer—Manheim Mfg. & Belting Co., Manheim, Pa.

Room Air Conditioners

Introduction of three new models of unit room air conditioners for the 1954 line. . . . New features include an automatic reverse cycle heating and cooling unit and a night light to illuminate the "Weather Bureau" controls. Model 45 is a ½ hp standard unit operating on 115 volts; model 411-S, a 1-ton unit, featuring four-position switches, pushbution "Weather Bureau" controls, operating on 230 volts; and model 414 is a 1½-ton full rated window unit.

This NEW METHOD DRIES AIR

PRECISELY AS YOU WANT IT



NIAGARA CONTROLLED HUMIDITY AIR CONDITIONING

This method removes moisture from air by contact with a liquid in a small spray chamber. The liquid spray contact temperature and the absorbent concentration, factors that are easily and positively controlled, determine exactly the amount of moisture remaining in the leaving air. Heating or cooling is done as a separate function.

The Niagara's Controlled Humidity Method using HYGROL moisture-absorbent liquid is

Best and most effective because . . . it removes moisture as a separate function from cooling or heating and so gives a precise result constantly and always. Niagara machines using liquid contact means of drying air have given over 20 years of service.

Most reliable because . . . the absorbent is continuously reconcentrated automatically. No moisture-sensitive instruments are required to control your conditions.

Most flexible because . . . you can obtain any condition at will and hold it as long as you wish in either continuous production, testing or storage.

Easiest to take care of because . . . the apparatus is simple, parts are accessible, controls are trustworthy.

Most compact, taking less space for installation.

Inexpensive to operate because . . . no re-heat is needed to obtain the relative humidity you wish in normal temperature ranges and frequently no refrigeration is used to remove moisture.

The cleanest because . . . no solids, salts or solutions of solids are used and there are no corrosive or reactive substances.

For complete information write

NIAGARA BLOWER COMPANY

Over 35 Years of Service in Industrial Air Engineering

Dept. HP, 405 Lexington Ave. New York 17, N. Y.

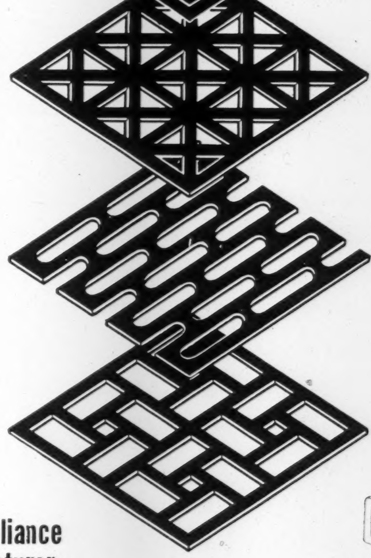
Sales Engineers in Principal Cities of U. S. and Canada

Start NOW to Cut Your Production Costs, with

HIGHEST QUALITY

DIAMOND *Ornamental* PERFORATED METAL

PROMPT DELIVERY



Grecian Cane Design — **42% Open Area**

Side Stagger Design — **40% Open Area**

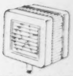
Tile Cane Design — **52% Open Area**

Mr. Appliance Manufacturer:

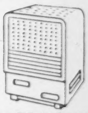
The ornamental designs above are only a few of the many you can choose from in our new 36-page catalog No. 39. We can supply ANYTHING you need in the way of Perforated Metal, Ornamental Cane, Architectural Grilles, etc., in any metal and in any practicable thickness (depending upon the size of the unit opening) from light-gauge sheet to fairly heavy plate. We're fully equipped, also, to fabricate special sections to any desired extent.

Specialized production equipment . . . backed by 38 years of successful manufacturing experience, enables us to do this kind of work efficiently and, usually, at a much lower cost than you can do it yourself. We carry large stocks — you have no inventory problem — no delays because of material shortages.

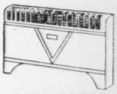
Write, today, for a free copy of Catalog 39 and send us your blueprints. Our engineers welcome opportunities to make money-saving suggestions.



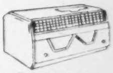
UNIT HEATER



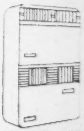
SPACE HEATER



CONVECTOR



ROOM AIR CONDITIONER



STORE AIR CONDITIONER

DIAMOND MANUFACTURING CO.

Box 45 WYOMING (Wilkes-Barre Area) PENNA.

◆ *Sales Representatives in Principal Cities from Coast to Coast. Consult Your Classified Telephone Directory.* ◆

CLEVELAND DRAFT CONTROL SYSTEMS ARE UL LISTED

LISTED UNDER REEXAMINATION SERVICE UNDERWRITERS' OF LABORATORIES, INC.

UNDER RE-EXAMINATION SERVICE OF UNDERWRITERS' LABORATORIES, INC., FOR OIL, GAS, STOKER OR COMBINATION FIRING

Here is what this means to you— When you specify, install or use CLEVELAND (patented) Sequence Draft Control Systems, you can now have the assurance that both the control and operating units have been tested and listed by Underwriters' Laboratories, Inc., for the following:

- **SAFETY**—Interlocks with combustion safety controls for safe, dependable operation of control system with the resulting safety of boiler operation.
- **DESIGN**—Correct mechanical and electrical engineering, with proper materials and construction.
- **ACCURACY OF PERFORMANCE**—Sensitivity of instruments to variations in overfire draft and correct electrical and mechanical linkage to provide accurate automatic control within strict tolerance limits.
- **DEPENDABILITY OF OPERATION**—Proven by extreme tests to provide adequate safety factors for all conditions.
- **ENDURANCE**—Separate components passed rigid endurance tests. Complete system performs accurately after 100,000 operations.

CLEVELAND
DAMPER CONTROL
CLEVELAND
LECTRICARM

Model DCR-CL Draft Control and "Lectricarm" Drive Unit

Only CLEVELAND DAMPER CONTROL has the ADJUSTABLE START FEATURE for induced draft systems

Write for complete information

The CFE line includes damper controls, steam controls, electronic smoke detector control units, draft, air pressure and flue temperature gages.

COMBUSTION CONTROLS
CLEVELAND FUEL EQUIPMENT CO. CLEVELAND OHIO

CLEVELAND *fuel Equipment* COMPANY
1111 BROOKPARK RD. • CLEVELAND, OHIO

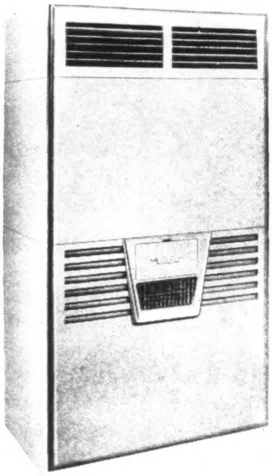
EQUIPMENT DEVELOPMENTS . . .

[*Continued*]

Manufacturer—Fedders-Quigan Corp., 57 Tonawanda St., Buffalo 7. N.Y.

Packaged Air Conditioner

Restyled and re-engineered 1954 line of packaged air conditioners featuring greater flexibility. . . . The new equipment, available in 2, 3, 5, 7½ and 10 hp sizes, is designed to permit a choice of air intake and discharge panels for front, side or rear installation. The units are of sectional construction, comprising compressor, blower and plenum. For year-round operation, a heating coil can be mounted in the blower cabinet. Other new design features include a new airfoil louver discharge grille, a central control panel, new spring mounting and a single filter section to handle both free and open air intake.



Manufacturer—United States Air Conditioning Corp., 33rd and Como Ave., S.E., Minneapolis 14, Minn.

EQUIPMENT BRIEFS . . .

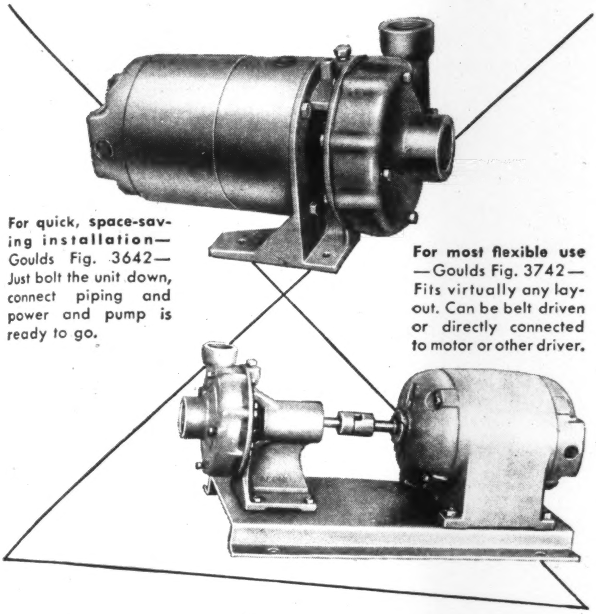
INSTRUMENT TUBING HARNESS with color coded lines to simplify installation of instrument lines. . . . Known as the "Impervapak Poly-Cor," it is available with 4, 7, 10, 14 or 19 tubes and has individual lines coded in black, red, blue or green. The harness is composed of a bundle of polyethylene tubes over which is extruded a sheath of vinyl plastic.

Manufacturer—Dekoron Tubing Div., Samuel Moore & Co., Mantua, Ohio.

HIGH-IMPEDANCE INSTRUMENT with a new input circuit to provide a wide d-c application potential. . . . Available with pen speeds of 2, 1½, 12 and 24 seconds, the instrument may be used for small current measurement with fixed source impedance, millivoltage measurement with variable source impedance and high impedance d-c bridges.

Manufacturer—Minneapolis-Honeywell Regulator Co., Industrial Div., Wayne and Windrim Aves., Philadelphia 44.

Which of these 2 COST-CUTTING GOULDS PUMPS best fits your air conditioning plans?



For quick, space-saving installation—Goulds Fig. 3642—Just bolt the unit down, connect piping and power and pump is ready to go.

For most flexible use—Goulds Fig. 3742—Fits virtually any layout. Can be belt driven or directly connected to motor or other driver.

both units have these advantages

EASY TO CONVERT—Just change impeller and casing to convert from one size to another.

SPECIAL DESIGNS—Both units are designed for air conditioning, but both can be used for booster and condensate service, too. Capacities to 110 G.P.M., heads to 120 ft.

QUIET OPERATION—The only moving part is the balanced impeller which assures minimum noise and wear.

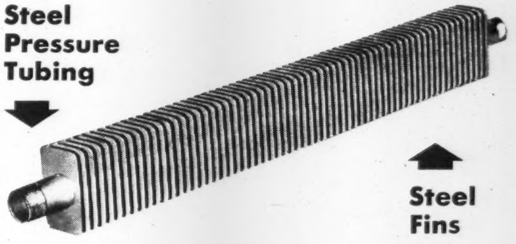
NO STUFFING BOX LEAKAGE—Mechanical seal prevents leakage without binding shaft. Requires no adjustment or maintenance.

TROUBLE-FREE SERVICE—Sturdy construction and permanent alignment of moving parts assure long operating life with minimum maintenance.

For full details, specifications, performance curves, send for Bulletins 624-A3 and 625-A3.

Goulds PUMPS INC.
Seneca Falls
New York

STEEL TO STEEL KEEPS FINS TIGHT



Maximum efficiency in finned radiation requires perfect, continuous contact between fins and pipe at all times for only when this contact is perfect will there be maximum heat transfer from pipe to fins and from fins to room air.

AUTORAD uses steel for *both* tube and fins and since the coefficient of expansion of fins and tubing is the same, no amount of expansion or contraction can lessen the bond between them and decrease heat transfer. And no electrolytic action can destroy the perfect bond.

AUTORAD has developed a method of bonding fins to tubing so that the resulting contact is as firm and perfect as a welded joint. As a consequence heat transfer is kept at peak efficiency.

To you as a contractor this means long years of customer satisfaction and customer satisfaction means greater profits to you.

Ask for complete data and prices.

AUTO-RAD Inc.

3535 Fillmore Street, Chicago 24, Illinois

ASCO® BIG VALVE Values
designed into SMALL Solenoid Valves

2-Way and 3-Way
General Purpose Valves
in the 1/8" to 1/2" Pipe Size Range

Design Features

- Capable of sustained fast repetitive operations over very long periods
- Snap action — opening and closing
- Full size orifices, assuring maximum unrestricted flow
- No closely fitted parts to make valve susceptible to jamming by small foreign particles
- Compactness — sizes to meet any restrictive space requirements

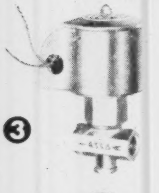
These small ASCO Solenoid Valves — examples of our design skills — may be just what you need for controlling automatically the flow of liquid or gas in your machine, instrument or pipe line. Complete details will be sent on request. If you have other control problems, why not let our engineers work on them? We have been serving industry in the field of electromagnetic controls for 65 years and can offer a great variety of Solenoid Valves covering many different services.

ASCO
General Purpose
Packless Solenoid Valves
for

Air, Gas, Water, Refrigerants, Light Oils, Heavy Oils and Other Non-Corrosive Fluids. 212°F. Maximum Temperature for Liquids and Gases; up to 450°F. for Steam (High Temperature Coils).

❶

❷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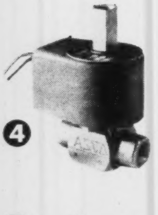
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❶ Bulletin 8262
ASCO 2-Way Valve
Pipe Size — 1/8" and 1/4"
Maximum Pressure 1000 psi

❷ Bulletin 8265
ASCO 2-Way Valve
Pipe Size — 3/8"
Maximum Pressure 250 psi
(Steam to 175 psi)

❸ Bulletin 8268
ASCO 2-Way Valve
Pipe Sizes — 3/8" and 1/2"
Maximum Pressure 475 psi

❹ Bulletin 8314
ASCO 3-Way Valve
Pipe Size — 1/8"
Maximum Pressure 125 psi
(Other Small 3-Way ASCO Valves to 1/2" pipe size available)

ASCO Solenoid VALVES

Write for free pamphlet
"Small Solenoid Valves"

Automatic Switch Co.
389 LAKESIDE AVENUE · ORANGE, NEW JERSEY

RECENT TRADE LITERATURE..

Boiler Reference Guide

New 32-page general catalog, No. 80, published as a reference guide for architects, engineers and heating contractors. Included is complete data on the manufacturer's line of high and low pressure steel boilers. Also included are descriptions and illustrations of water heating products, both direct fired and storage types as well as indirect water heating coils. Sections on boiler support brackets, structural steel suspension and induced draft fans complete the technical manual.

Manufacturer—Kewanee-Ross Corp., 101 Franklin St., Kewanee, Ill.

Gas Fired Unit Heaters

Technical bulletin No. 23-3 covers the manufacturer's line of "Series 23A" gas fired unit heaters. The line includes propeller fan and blower type heaters, each produced in 11 models, ranging in capacity from 55,000 to 500,000 Btu per hr and burning all types of gas at the rated capacities. The booklet includes capacity tables and roughing-in dimensions, as well as structural and operational descriptions.

Manufacturer—United States Air Conditioning Corp., 33rd and Como Ave. S. E., Minneapolis 14, Minn.

Flexible Metal Hose Catalog

New 32-page illustrated catalog, No. 130 R, covers the company's full line of corrugated metal hose, convoluted hose types, stainless steel flexible metal hose and numerous special purpose assemblies. Featured is a new industrial heavy duty stainless steel hose. Also covered are coupling types and detailed installation information.

Manufacturer—Flexonics Corp., 1391 S. Third Ave., Maywood, Ill.

Ladder Specifications

There's a Right Ladder for Every Job. ASA Code, gives safety rules for the use of portable wood ladders. One section covers the use and care of ladders. Requests for copies should be written on company letterhead and accompanied by nine cents to cover the cost of mailing.

Published by—The American Ladder Institute, 666 Lake Shore Drive, Chicago 11.

Lubricating Methods for Motors

Comparisons of methods for lubricating electric motors are depicted in Bulletin 1848. The bulletin illustrates three principal types of bearings used in motors —cartridge, standard open and "Lubriflush"—with explanations of the function of each. A series of natural color photographs demonstrate the process of transverse lubrication.

Manufacturer—U.S. Electrical Motors Inc., Box 2058, Los Angeles 54.

Marine Heating

Marine heating and plumbing catalog illustrates modern equipment for use in the marine field, including all types of naval craft and commercial vessels, as well as larger private yachts. Also described are the

They SELL! They PLEASE!

AURORA

CLOSE-COUPLED

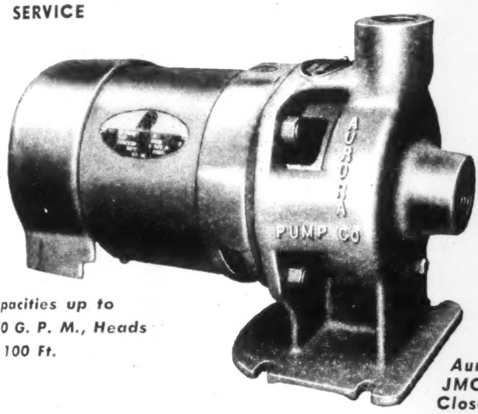
Packaged

AIR CONDITIONING PUMPS

for
EVAPORATOR COOLING TOWERS
•
AIR CONDITIONING UNITS
•
also for
GENERAL SERVICE

These are outstanding pumps, high in favor with air conditioning contractors and manufacturers of air conditioning equipment. Mechanical seal requires no packing or maintenance. Disassembly without disturbing pipe connections or hold down bolts.

- LOW COST
- SMOOTH, QUIET
- DEPENDABLE
- LONG LIVED
- MECHANICAL SEAL
- DISASSEMBLY is QUICK, SIMPLE
- CARRIED IN STOCK



Capacities up to 150 G. P. M., Heads to 100 Ft.

Aurora Type JMC Pump — Close-Coupled

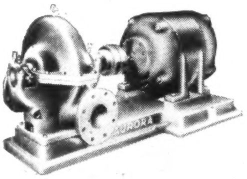
CASINGS vertically split. Casing wearing ring standard.

MECHANICAL SEAL—standard, located in packing cover.

IMPELLER — balanced, enclosed type, high grade bronze.

MOTOR—NEMA specs., stainless steel shaft on JMC — for all circuits and various enclosures.

BALL BEARINGS — on JMC, built into motor.



OTHER AURORA AIR CONDITIONING UNITS

We are also in a position to supply various sizes of air conditioning pumps in V-Belt drive, and flexible coupling drive. Our large size type G.M.C. Close-Coupled Pumps can be furnished up to 800 G.P.M. and heads to 200 ft.

ALSO —
AURORA SPLIT CASE CENTRIFUGAL PUMPS

— single and two stage for water supply, handling condenser circulating water, brine circulation, booster service and many other duties.

Complete Information on Request

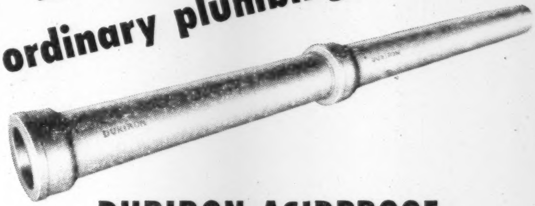
DISTRIBUTORS IN PRINCIPAL CITIES

AURORA Always PUMPS

AURORA PUMP COMPANY

Division of the New York Air Brake Company
80 Loucks Street
Aurora, Illinois

The permanent drain pipe installed by ordinary plumbing methods

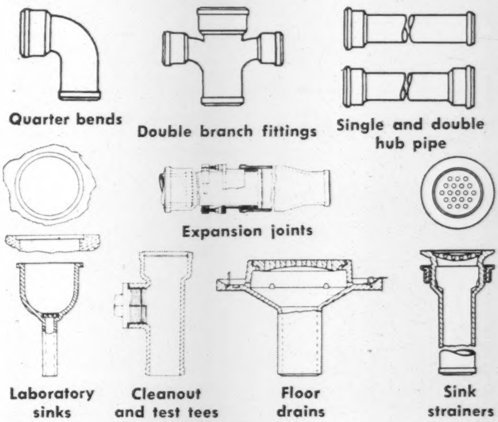


DURIRON ACIDPROOF DRAIN PIPE AND FITTINGS

Duriron is a high silicon iron alloy highly resistant to most commercial acids at practically all temperatures and concentrations. It is not a coating—the entire thickness of the pipe wall is resistant to abrasion and erosion as well as to corrosion.

The labor cost of installing Duriron is the same as with ordinary cast iron soil pipe. Normally the initial cost is the final cost since Duriron will generally outlast the building in which it is installed.

SOME OF THE MORE THAN 60 STANDARD DURIRON FITTINGS



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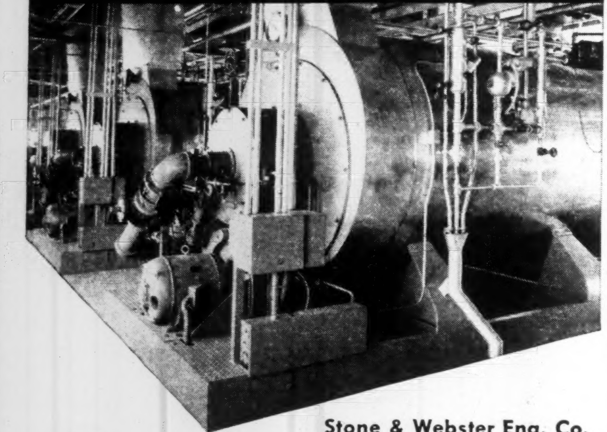
THE DURIRON COMPANY, Inc.
404 North Findlay Street
DAYTON, OHIO

DURIRON
LOOK FOR THE NAME ON EVERY PIECE

For steam demands ranging from 2,000 to 50,000 lb. per hour....



Stone & Webster Eng. Co. Installed for the Washington Gas Light Co.

CYCLOTHERM CYCLONIC COMBUSTION!

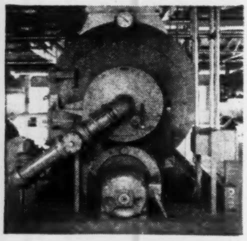
At its new gas storage plant in Rockville, Md., Washington Gas Light Co. faced a complex steam problem. The winter load averages only 2000 lb. per hour at 15 psi with no superheat. During extremely cold weather, however, send-out loads require as high as 50,000 lb. per hour—and it must be supplied immediately.

To meet this problem efficiently, four 500 hp Cyclotherm gas-fired steam generators were installed with 17,500 lb. steam capacity per hour each. Any single unit supplies normal needs, a combination of any three meets peak loads quickly.

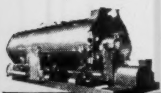
Ability to reach full capacity from a cold start in only 15 to 20 minutes was a prime consideration. Using the *patented* Cyclonic Combustion principle, air enters the combustion chamber at extremely high velocity in a free spiral vortex. Fuel introduced into the entering air is slowly consumed as it travels through the combustion chamber. This highly luminous, slow burning flame—radiating heat to the fire tubes through direct radiation and by convection—results in an unusually high rate of heat transfer, rapidly building to full-rate steam capacity.

ADDITIONAL FEATURES

1. Two-pass design which reduces fuel consumption and saves up to ⅓ the space of conventional steam generators.
2. Compact, standardized package unit fully equipped with burner, appliances and controls.
3. Automatic operation which confines boiler attendance to periodic checkups.
4. Minimum refractory materials which results in reduced labor, time and cost of maintenance.



Cyclotherm Steam or Hot Water Generators are made in sizes from 18 to 500 hp, 15 to 200 psi operating pressures. Write today for full descriptive literature.



Just drop a card to Cyclotherm, Dept. 26, Oswego, N. Y.

CYCLOTHERM® STEAM GENERATORS

CYCLOTHERM DIVISION UNITED STATES RADIATOR CORP.—OSWEGO, NEW YORK

RECENT TRADE LITERATURE . . .

[Continued]

company's line of valves made expressly for marine service.

Manufacturer—Crane Co., 836 S. Michigan, Chicago 5.

Metal Expansion Bellows

Six-page Bulletin No. 300 describes metal expansion bellows for conveying gas and liquids. Text and diagrams explain the welded-diaphragm construction of the bellows. The company states that this process results in a bellows able to withstand high temperature, vibration and corrosion. Engineering specifications are given for the standard male type and the nesting type.

Manufacturer—Titeflex, Inc., 500 Frelinghuysen Ave., Newark 5, N.J.

Motor Frame Selection Chart

A selection wall chart shows the comparison between old and new NEMA standard dimensions for a-c motors from 1 to 30 hp. The chart is designed to provide a quick reference for determining differences in frame dimensions. New and old dimensions for polyphase squirrel cage, polyphase wound-rotor, and single-phase, foot-mounted motors are presented as well as separate dimensions for flange-mounted motors. Dimensions for dripproof and totally enclosed, fan cooled motors are also given.

Published by—Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

Oil Fired Space Heater

Bulletin No. 550 describes the company's new "Paraflo" oil fired, warm air space heater. The heater is available in two capacities, 200,000 and 250,000 Btu per hr. The folder also describes many special construction features such as a floating stainless steel combustion chamber. A table of specifications gives engineering design data.

Manufacturer—Dravo Corp., 1203 Dravo Bldg., Pittsburgh 22, Pa.

Pipe Data Card

Data card, TDC 138 A, is designed to be of use to those involved in the selection, application and installation of carbon, alloy and stainless steel pipe. The card contains information on dimensions, weights, specifications, grades and analyses of seamless and welded carbon and other types of pipe. Data is given on six pipe size schedules and steels covered by ASTM and ASME piping specifications.

Manufacturer—Tubular Products Div., The Babcock & Wilcox Co., Beaver Falls, Pa.

Positioner for Cylinder-Operated Devices

Bulletin 473 describes the "Poweractor," a new force-balance type positioner for cylinder-operated devices. The unit is designed to position equipment requiring high power and long stroke, such as large size control valves, large dampers and variable speed drives, through pneumatic cylinder operating mechanisms. Complete specifications are given along with data to aid in

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THE SURE CURE FOR COLD RADIATORS

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AIR
ELIMINATOR
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PAT. Nº 2494293

with GORTON VALVES every radiator is made to heat EVENLY and QUICKLY with OUNCES of vapor . . . instead of pounds of pressure.

For Steam Mains and Unit Heaters

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VALVE
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For Radiators

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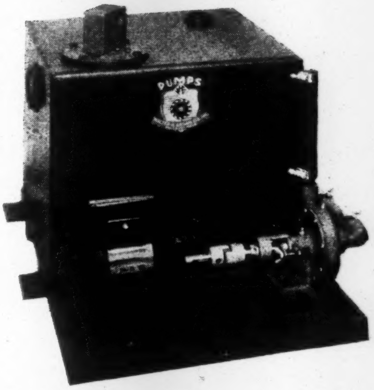

The Eagan Eagle is your best buy from a performance, construction and price standpoint. It provides far more capacity than any similar pump at the same price . . . sells for only $124.00 (trade price F.O.B. Phila.)

Look at These Outstanding Features:

1. A low return inlet eliminates need for a pit even though return lines are as low as a foot above the floor
2. Capacity to 8000 sq. ft. EDR at 20 psi is obtained
3. The all bronze centrifugal pump has a non-clogging open impeller, stainless steel shaft, life sealed bearing
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5. Thermal overload protection is provided
6. Base is heavy structural steel, drip-lip type with a 1/2" ips drain
7. Motor is standard 1/4 hp, 115 volt, quiet capacitor type

Other models are available with capacities to 100,000 sq. ft. at 200 psi. Mail coupon today for free descriptive literature.

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Mfrs. of Condensate, Vacuum, Turbine, Boiler Feed, Centrifugal and Proportioning Pumps and Fuel Oil Pump & Heater Sets.

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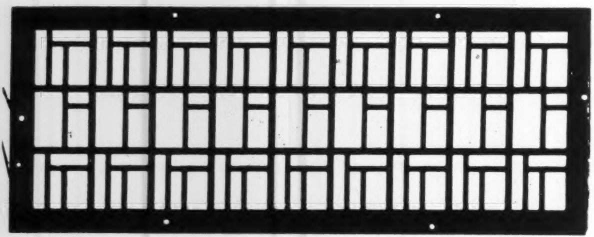
GRILLES —
FOR THAT

Distinctive Decor



Just as eye-appealing as they are functional, Hendrick Perforated Metal Grilles will greatly enhance the beauty of any decorative motif.

They provide more-than-ample open area for the free passage of air, and are available in a wide variety of designs to best set off your decor. And they're easy to install — always lie flat because of a special flattening operation in their manufacture.

Over one hundred basic designs are available to choose from — many are originals obtainable only from Hendrick. They're furnished in aluminum, bronze, steel or stainless steel. For more complete details on designs and specifications write Hendrick direct!

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Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Architectural Grilles • Mitco Open Steel Flooring • Shur-Site Treads • Armorgrids

RECENT TRADE LITERATURE . . .

(Continued)

applying the positioner to specific control problems.

Manufacturer—The Foxboro Co., Foxboro, Mass.

Power Plant Cleaning

How to Make Power Plant Cleaning Easier is a 12-page handbook on cleaning equipment for use in steam stations diesel and electric power plants and de-scaling. It gives methods and solution concentrations and temperatures used for cleaning jobs such as: descaling surface condensers and heat exchangers; cleaning compressors, steam turbines, filters, boilers, gas burners, electric motors; removing carbonized oil from copper cooling coils, and varnish from steel plates, bolts and nuts used on transformer coils.

Requests for copies of the book should be written on company letterhead.

Manufacturer—Oakite Products, Inc., 157 Rector St., New York 6.

Pressure Transmitter

Bulletin A-707-A describes the "Type D2T" differential pressure transmitter, giving principles of operation. It is used with the company's "Autronic" controlling and recording system. An all electronic system is employed for transmitting the measured variable to the controller and recorder. The booklet is illustrated with hook-up and schematic diagrams, phantom-cutaway views and dimensional diagrams.

Manufacturer—The Swartwout Co., 18511 Euclid Ave., Cleveland 12.

Process Industry Equipment

Facilities for the custom fabrication of process industry equipment in standard and special alloys are outlined in a Bulletin 10. In addition to covering the range of products produced by the firm's fabricating and heat exchanger divisions, the bulletin gives data on sizes and types of all production equipment, productive capacity and transportation facilities.

Manufacturer—Quaid Fabrications, Inc., 157-167 W. Oxford St., Philadelphia 22.

Refrigeration Condenser

Unicon Application Manual U-250 contains documented information on how to eliminate water on any size refrigeration or air conditioning system through the use of the company's "Unicon"—a self-contained remote type air cooled condenser. The information is based on 15 years' experience.

Manufacturer—Kramer Trenton Co., N. Olden & Breunig Aves., Trenton 5, N.J.

Registers, Grilles and Diffusers

Four-color catalog, No. 51-AC, has been enlarged to include complete engineering data on the company's line of registers, grilles and diffusers. One section shows the "Perimeter Diffuser" line with installation information, selection charts and engineering data.

Manufacturer—Air Control Products, Inc., Coopersville, Mich.

CUT STEAM COSTS with MULTIPLE CONVERTIBLE FIRING!

GAS
HEAVY OIL
LIGHT OIL
STOKER COAL
HAND-FIRED COAL
GAS-OIL
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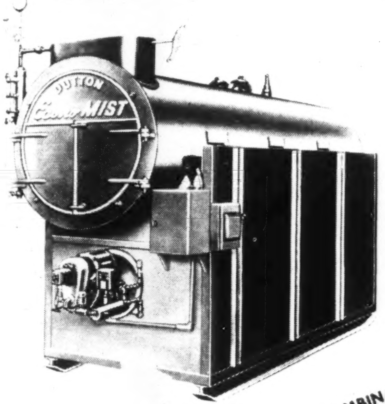
OIL-COAL
CORN HUSKS
WOOD CHIPS
OTHER FUELS
AND COMBINATIONS



...all handled by this PACKAGED AUTOMATIC

Dutton EconoMIST

YOU GAIN BIG, cost-cutting advantages when you install an EconoMist! Delivered in a "package", it's ready for service connections—soon ready to give you quick steam *automatically.*

AND NOTE the *partial* list of fuels you can use — singly or in many combinations—as any *one* offers you the greatest saving. You can equip to fire with waste by-products when they're available—or use gas, coal or oil . . . part or full-time!

WITH ANY FUEL, the EconoMist gives you the *tremendous reliability* and *long, long service life* of simple H.R.T. design.

BE SURE you learn all the ways this Dutton EconoMist can cut your steam costs. . .

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FOUR TYPES
SIZES FROM 5 TO 250 H.P.

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FOR BETTER VALVE AND UNION PERFORMANCE:

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All Star Team

An unbeatable combination — the "first string" team of valve and union for dependable trouble-free piping installations.

Look at the lineup:

U-01 BRONZE GLOBE VALVE

★ Renewable Composition Disc
Perfect sealing at all times—
A disc for every type of service—
#50—a hard disc for general usage
#52—a rubber disc for cold water valves
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—Quick, easy disassembly
—No sliding or scraping between body and bonnet—NO WEAR

★ Radial Seat of Two Piece Union Bonnet
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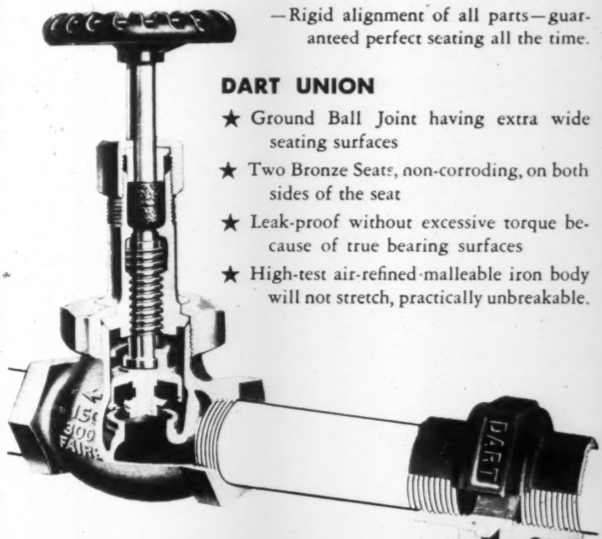
DART UNION

★ Ground Ball Joint having extra wide seating surfaces
★ Two Bronze Seats, non-corroding, on both sides of the seat
★ Leak-proof without excessive torque because of true bearing surfaces
★ High-test air-refined malleable iron body will not stretch, practically unbreakable.



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The Governair fan and coil cabinet unit shown above is a deluxe component of high quality air conditioning systems that employ directly expanded refrigerants or chilled water. A large capacity air handler especially designed for installations where space limitations exist. Heating is accomplished by the use of steam or hot water.

For the answer to your air conditioning costs and problems, call on Governair — *the *originators of packaged air conditioners!*

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COMPLETELY PACKAGED AIR CONDITIONERS*

BLAST COILS FOR HEATING & COOLING

*Type SCU Conditioners — Patent No. 2,297,928

GOVERNAIR

TYPE SC CONDITIONERS

Governair Corporation, 513 N. Blackwelder, Oklahoma City, Okla.

RECENT TRADE LITERATURE . . .

(Continued)

Replacement Refrigeration Controls

Replacement Reference Manual No. 1544 supersedes the manufacturer's Manual No. 1244 issued in 1949. Completely revised, it lists over 4636 replacement refrigeration controls. This manual is available to refrigeration service men only through manufacturer's wholesalers. The manual lists trade names and manufacturers of refrigeration equipment by year and models, parts numbers, code numbers, original mounting bracket hole centers, suggested changes to approach original specifications, original control settings such as cut-out, cut-in and dial knob position, and instructions to reset control.

Manufacturer—Ranco Inc., 610 W. Fifth Ave., Columbus, Ohio.

Scale and Corrosion Inhibitor

Folder describes "Klarite," a water soluble, activated compounded polyphosphate used to remove scale and eliminate corrosion in low pressure boilers, hot water systems, cooling towers, evaporative condensers, etc.

Manufacturer—Water Control Engineering Co., Brookside Theatre Bldg., Kansas City 13, Mo.

Single Stage Turbine

Bulletin 4206 contains design features, dimensions and performance data on the "HCB" single stage turbine. Maximum operating conditions are: horsepower to 100, pressures to 300 psig, temperature to 550 F and speed to 4000. The bulletin presents a two-page cutaway diagram with a descriptive list of 18 design features. Length and width measurements and dimensions of parts are given in line drawings. Other information includes performance data and specifications for construction material.

Manufacturer—DeLaval Steam Turbine Co., Trenton 2, N.J.

Solenoid Valves

Technical Bulletin W-7 describes line of solenoid valves which open or close in response to time clock, pressure switch, manual switch or other impulses. The new bulletin contains complete operating instructions along with detailed parts lists and dimensions.

Manufacturer—Golden-Anderson Valve Specialty Co., 2104 Keenan Bldg., Pittsburgh 22, Pa.

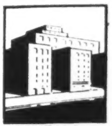
Spray Nozzles

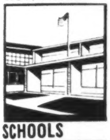
Catalog No. 24 illustrates and describes standard and special industrial spray nozzles. For each nozzle, complete data is listed covering capacity and spray angle. Dimensional specifications for all standard nozzles are also given. The nozzles are indexed according to spray pattern. In addition, information is supplied for related equipment such as line strainers, elbows, check valves and adjustable joints. Tables are included on spray coverage and pipe frictions.

Manufacturer—Spraying Systems Co., 3219 Randolph St., Bellwood, Ill.

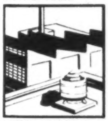
FRESH AIR...ANYWHERE

WITH MUCKLE VENTS


HOSPITALS


SCHOOLS

PUBLIC, CIVIC, BUILDINGS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FOOD PROCESSING PLANTS

ANY AIR . . . ANYWHERE . . . foul or moist, stale or dry, smoky or gaseous . . . it's up and out quickly with a Muckle Vent. Proven, tested performance of Muckle Vents guarantees superior efficiency on any building, new or old, under any conditions. Architects, designers and builders who compare - specify reliable Muckle Vents.

For greater working efficiency or controlled customer comfort . . . you can depend on Muckle Vents. Streamlined, propeller driven, roof mounted . . . motor out of air stream . . . easy to install . . . available in 15 sizes from 254 CFM to 10280 CFM.

MOISTURE IS NO PROBLEM!

Muckle Vents are especially designed for maximum operating efficiency in removing moisture, filled air

Write today for FREE information on industry wide application

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Plan
HEAT TRANSFER
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Our Long Experience at Your Service

HEAT TRANSFER EQUIPMENT
REMPE CO.
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ENGINEERED
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for EFFICIENT
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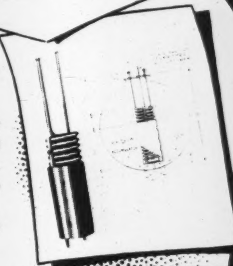
The Rempe "HOT SPOT" Fuel Oil Preheater

This efficient heater is available in 16" or 14" diameter size, and for use with hot water or steam. For use in oil storage tanks up to 12 feet diameter.

List Price $87.50

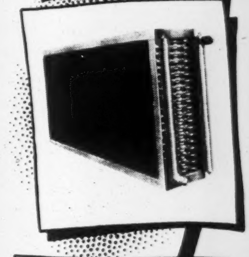
Write for full descriptive data.



Rempe Fin Coils for Heating or Cooling Application

Fin Coils designed by Rempe always carry their heat load with ease because they are never overrated. Made for any refrigerant, cold water, hot water or steam. For any temperature between minus 60° to plus 350° F.

Send us your special problems.



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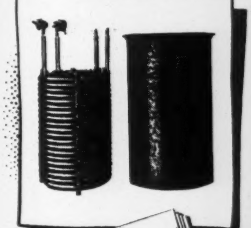
Rempe has been making pipe coils for 57 years. Any diameter or any length, to your specifications or our design. Can be supplied in any Steel, Alloy, Stainless Steel, Copper or Aluminum.

Send full details for engineering assistance or quotation.



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The Rempe Engineering Data Book

Complete Engineering data for design of Pipe Coils or Fin Coils. All Heat Transfer Coefficients. Most essential to the Engineer's library. Send for your copy.

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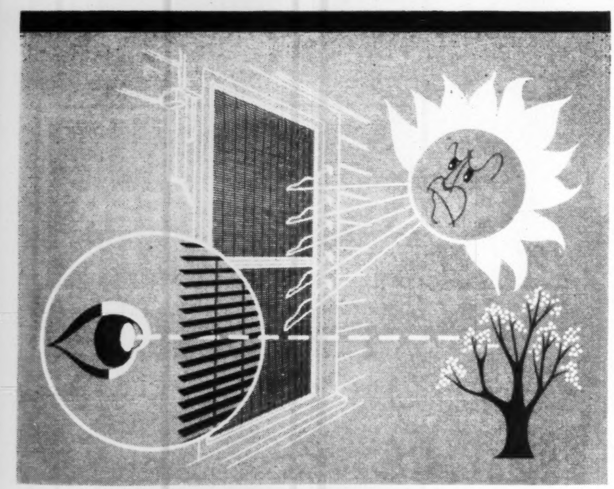
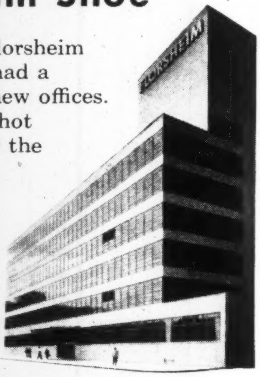


KOOLSHADE SUNSCREEN®
solves office heat problem
for Florsheim Shoe



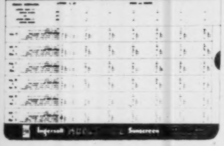
The general offices of the Florsheim Shoe Company in Chicago had a personnel problem in their new offices. With air conditioning, on a hot day the private offices along the windows would be cool and comfortable. But the open general office space in the center was too cold for comfort. If the thermostat was raised, the open office space then became uncomfortably warm.

KOOLSHADE SUNSCREEN keeps the sun's heat out, and lets in cool, glareless light

Florsheim installed KOOLSHADE Sunscreen on the east, south and west office windows and blocked out the heat before it ever entered the offices. KOOLSHADE Sunscreen not only solved the personnel problem, but reduced the peak load demand on the air-conditioning unit by 35 tons . . . or 20%.

KOOLSHADE Sunscreen can solve many of your summer heat and glare problems. Specify KOOLSHADE with Ingersoll framing for undivided responsibility and maximum performance.

Sun Position, Heat Gain and Shading Data Calculator



Write today for your Heat Gain Calculator. This time-saving tool determines sun altitude, shadow angle, sun-window azimuth and sun heat transmitted through glass for any window orientation in any season. Available for 6 different latitudes. There is a small charge.

Ingersoll Products Division, Borg-Warner Corp., 310 South Michigan Avenue, Chicago 4, Illinois, Dept. HP

BW

Ingersoll KOOLSHADE Sunscreen

RECENT TRADE LITERATURE . . .

(Continued)

Switchboard Instruments

New 24-page bulletin covers long-scale switchboard instruments. Designated GEC-218C, the publication contains a description of the company's "AB-DB-18" and "AB-DB-16" instrument lines as well as principles of operation, characteristics and specifications. Prices and dimensions are also provided.

Manufacturer—General Electric Co., 1 River Rd., Schenectady 5, N.Y.

Temperature Control Systems

Bulletin F 6149, *Temperature Control Systems*, covers industrial process temperature control. One section is intended to aid in the selection of sensing elements and their correct use for the most satisfactory results. Control terminology is explained as well as rules to follow in selecting the proper method of temperature control for process characteristics or reaction.

Manufacturer—Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.

Three Dimensional Drafting

Three Dimensional Drafting is a technical discussion of the subject also known as axonometric drawing. Also included in the new booklet are illustrations of "Instrumaster" implements used in this type of drawing and a number of the most widely used templates and stencils used as aids in drafting.

Manufacturer—John R. Cassell Co., Inc., 110 W. 42nd St., New York 36.

Time Delay Relays

Line of solenoid-actuated, pneumatically-controlled time delay relays is described in Bulletin SR-3. The illustrated catalog describes two basic types of "Agastat" relays: one with time delay beginning when the coil is energized; and one with time delay beginning when the coil is de-energized. Typical applications listed include oil fired steam generating plants, air conditioning and refrigeration and aircraft heating and air conditioning. The catalog includes mounting dimensions and wiring diagrams.

Manufacturer—A'G'A' Div., Elastic Stop Nut Corp. of America, 1027 Newark Ave., Elizabeth, N.J.

Unit Heaters

New bulletin covers the design features of the company's "Utility" unit heaters. These are lightweight, horizontal discharge heaters for general purpose heating, using the "Featherfin" heating element with finned tubes of seamless drawn copper. The fan features a new type of motor mounting, incorporating an integral safety guard. Engineering data, with wiring and piping details, is also included in the bulletin.

Manufacturer—L. J. Wing Mfg. Co., 140 Vreeland Mills Rd., Linden, N.J.

Unit Heater Testing and Rating

Recently released is Bulletin 11, *Standard Code for Testing and Rating Hot Water Unit Heaters, Second Edition*. This is a complete revision of the first edi-

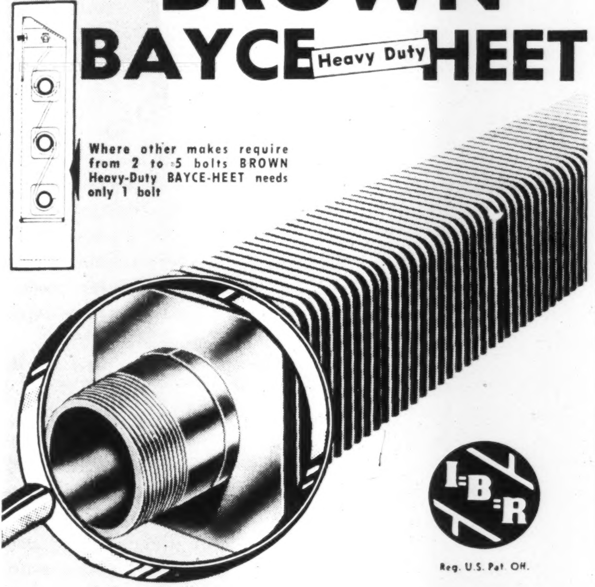
NOW 3 PLUS FEATURES

NEW MOVABLE 'S' HOOKS cut installation costs

NEW SLOPING COVER for improved appearance

NEW ADDITIONAL SIZES to suit every job

BROWN BAYCE Heavy Duty HEET



Where other makes require from 2 to 5 bolts BROWN Heavy-Duty BAYCE-HEET needs only 1 bolt

I=B=R

Reg. U.S. Pat. Off.

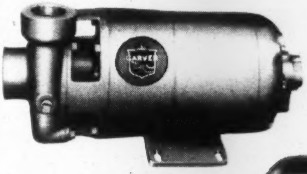
Contractors acclaim BROWN **Heavy-Duty BAYCE-HEET** "Easiest, Most **Economical** to Install." New movable 'S' **hooks eliminate** as many as four lag **bolts. Most contractors** figure $1.00 in**stallation cost per** lag bolt . . . save a lag **bolt and you save** a dollar. If the fintube **you now use** requires 4 lag bolts, you **save** $3.00 by switching to BROWN **Heavy-Duty BAYCE-HEET.**

Records of every-day jobs show installation savings averaging 10% with BROWN Heavy-Duty BAYCE-HEET.

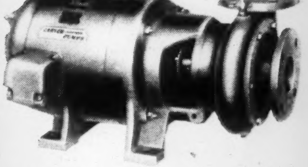
Write for Bulletin 300-1

BROWN PRODUCTS COMPANY
FOREST HILLS, NEW YORK

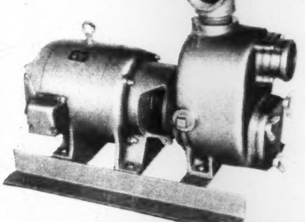
Got a *Pumping* problem? Let CARVER Help You Get Top Performance!



MODEL B ELECTROPUMP
5 to 70 G.P.M.



TYPE L ELECTROPUMP
30 to 900 G.P.M.



MODEL "K" PUMPS
Self-Priming
20 to 4000 G.P.M.

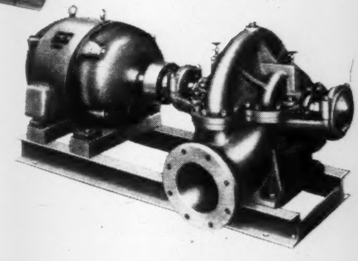


Fig. "400"
SPLIT-CASE PUMPS
200 to 2000 G.P.M.

Whatever your requirements there is a pumping unit in CARVER'S Complete Line that will fit your needs to a "T". On the easy jobs or the tough ones, the outstanding performance, inherent high efficiency and improved hydraulic design of CARVER PUMPS give you thoroughly dependable operation with full pumping economy . . . your best buy for better pumping. A few of them are illustrated.

Ask CARVER for the answer to your pumping problems . . . today. Give us the conditions, we'll give you the answer.

CARVER PUMPS are available with motor, gasoline engine, diesel or belt drive.

CARVER PUMP COMPANY
1460 Hershey Ave., Muscatine, Iowa

CARVER
the quality name in pumps

PETROMETER
INCHES

PETROMETER
REMOTE READING
LIQUID DEPTH
GAUGES

"Bring Your Liquid Level to Eye Level"

THE BEST GAUGE FOR:

Commercial and Industrial Fuel Oil Storage Tanks

Domestic Installations with Buried Tanks

Storage Tanks for other Industrial Liquids—gasoline, solvents, acids, etc.

HERE'S WHY:

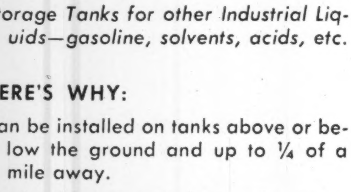
Can be installed on tanks above or below the ground and up to ¼ of a mile away.

No troublesome moving parts—operates on the principle of the U-tube. Simple, dependable and accurate.

Large, easy-to-read vertical scale gives tank contents at a glance. Scales are easily changed for different liquids.

Easy to install—the tank assembly for the gauge can be installed when the tank is empty or when containing liquid. It can also be installed separately to complete the tank work. The gauge can be connected any time later. Only one simple connection to tighten.

WRITE FOR BULLETIN PH TODAY.



FOR TANKS 20 INCHES TO 50 FEET DEEP.

LIQUIDEPTH INDICATORS, INC.
43-22 TENTH STREET
LONG ISLAND CITY 1, N. Y.

4

RECENT TRADE LITERATURE . . .

[*Continued*]

tion and uses present day instrumentation and practices, all verified by laboratory work. It is issued jointly by the publisher and the American Society of Heating & Ventilating Engineers. Its purpose is to provide a standard method of testing hot water unit heaters to assure proper capacity ratings. Included are discussions on the equipment for testing, test procedure and computation of tests.

Published by—Industrial Unit Heater Association, 2159 Guardian Bldg., Detroit 26.

Vaneaxial Blowers

Direct drive vaneaxial blowers, three types of belt-drive vaneaxial blowers and a special portable blower for exhausting fumes from tanks are described in Bulletin A-110. The 16-page brochure includes dimension drawings and figures and complete air delivery tables for all these blowers. Two of the belt-drive models, a high temperature blower and a new design for low volume, high pressure requirements, are new lines which have not been shown in any previous catalog.

Manufacturer—Hartzell Propeller Fan Co., P.O. Box 909, Roosevelt Ave., Piqua, Ohio.

Welding Booklet

The 32-page *DirectRod Guide* gives recommendations for more than 300 types of metal joining operations. There are approximately 40 illustrations of applications and 12 pages of charts. The booklet is divided into sections, each dealing with a specific base metal. At the end of each section is a chart listing the electrodes, alloys and fluxes which may be used on the various types of base metal.

Manufacturer—Eutectic Welding Alloys Corp., 40-40 172nd St., Flushing 58, N.Y.

Welding End Specifications

Bulletin No. 507 lists socket welding end and butt welding end dimensions as approved by the American Welding Society. According to the publisher, the bulletin is intended to fill the need for dimensional standardization in welding valves into lines for high pressure, high temperature service. Socket welding end dimensions are given for valves 2 in. and smaller. Butt welding end dimensions are given for pipe sizes from $2\frac{1}{2}$ in. to 16 in. Included in the bulletin are four diagrams indicating the standard preparation of valve butt welding ends.

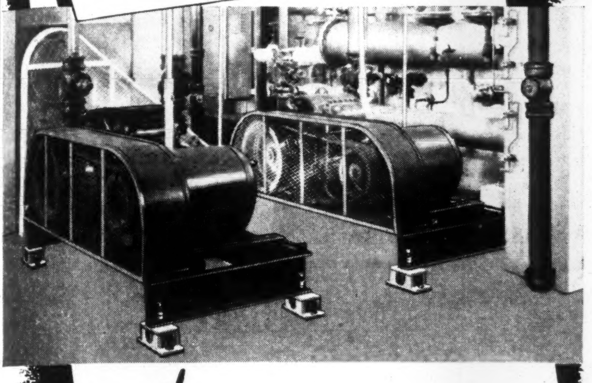
Published by—Edward Valves, Inc., 1200 W. 145th St., East Chicago, Ind.

Welding Rods

Wall *Rod Selector Chart* is designed to assist in the selection of the proper welding alloy for a specific job. The manufacturer lists more than 160 "Low Temperature Welding Alloys", their bonding points, tip colors, tensile strengths, etc., classified by type of metal and further subdivided by arc or torch applications. A brief description of the main uses for each rod and electrode is designed to give the user the most efficient usage of the materials listed.

Manufacturer—Eutectic Welding Alloys Corp., Dept. P, 172nd St. and Northern Blvd., Flushing 58, N.Y.

STOP VIBRATION



with KORFUND VIBRATION CONTROL

IN A HOSPITAL, quiet areas must be maintained free from vibration and noise. Korfund Isolators were furnished by The Vilter Manufacturing Company for this installation of two of their Vilter Freon VMC Compressors in the new wing of the Milwaukee Hospital, Milwaukee, Wis. Although these compressors were installed close to quiet areas without special foundations, the Korfund Isolators kept vibration and noise well below the requirements.

In addition to insuring quieter operation, Korfund Vibration Control units can:

- Permit installation *anywhere* in apartment, public and industrial buildings
- Decrease original building and foundation costs
- Permit installation without reinforcing floors
- Lengthen machine life
- Permit higher operating speeds — allowing use of smaller units
- Reduce maintenance costs

We'll gladly send more information on Korfund Vibration Control for compressors, fans, pumps, boilers, air conditioners and other equipment. Write today for your free copy of Bulletin No. 7, or see our catalog in Sweet's Files.

For specific recommendations, contact us or your local Korfund office. A half-century of experience is at your disposal.

THE KORFUND CO., INC.

KORFUND VIBRATION CONTROL
SPRINGS RUBBER CORK

48-01F Thirty Second Place, Long Island City 1, N. Y.
In Canada: 510 Canal Bank, Ville St. Pierre, Montreal

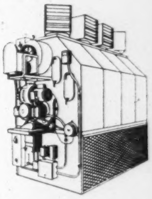
---

applications unlimited!

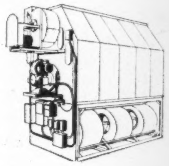
with National Champion direct-fired heaters . . .

Whatever your heating need, you'll find National Champion direct-fired space heaters meet the requirements. Each unit customed designed for efficient, automatic operation. Versatile, compact, rugged — National Champion heaters.

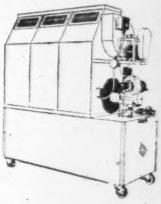
Many models for varied needs!



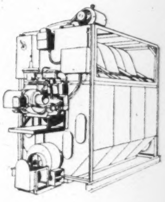
Model "H" — A vertical unit with discharge heads



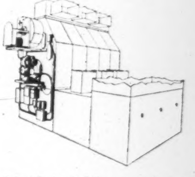
Model "D" — a vertical unit for duct work



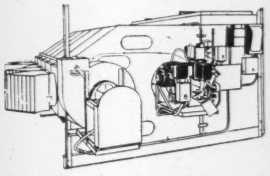
Model "P" — A portable, vertical unit for flexible duty



Model "R" — An inverted unit with discharge heads at bottom



Model "S" — A vertical unit with side blowers to permit proper location of air mixing dampers.



Model "C" — A horizontal ceiling suspension unit for space saving.

Capacities — 200,000 to 2,000,000 BTU/hour.

All National Champion heavy oil, light oil and gas fired heaters feature teardrop, stainless steel firebox design, electronic flame failure control, pressure type burners and are wired and flame tested at factory prior to shipment.

National Champion direct-fired heaters are listed by Underwriters' Laboratories, Inc.

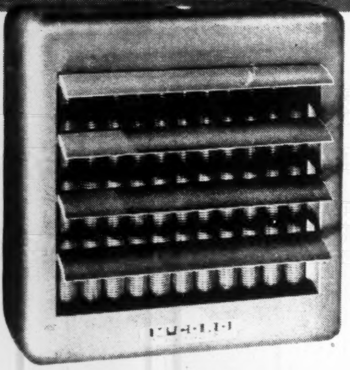
Information and specifications available upon request from National Heater Company

NATIONAL CHAMPION HEATERS

a product of National Heater Company, Inc.
Dept. A
2180 Cleora Avenue, St. Paul 4, Minnesota

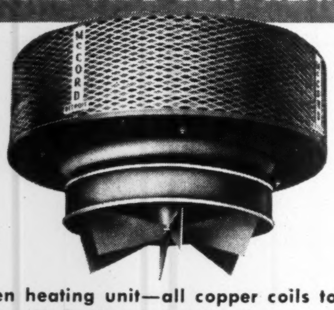
McCORD
HEATING AND
AIR CONDITIONING
PRODUCTS

HORIZONTAL TYPE UNIT HEATERS



Modern design—top performance—thousands in use—dependable heat. All copper coils to resist corrosion — individual tube expansion — most rugged construction — quiet operation — easy installation—standard motors with standard bases. Sizes to 272,000 B.T.U. capacity.

VERTICAL TYPE UNIT HEATERS



A proven heating unit—all copper coils to resist corrosion. McCord spiral tube fin construction creates air turbulence without undue restriction. Improved fan delivers large volume of air, with minimum air noise. All McCord heaters are guaranteed for use with 150 lbs. saturated steam pressure. Sizes to 575,000 B.T.U. capacity.

McCORD CORPORATION
DETROIT 11, MICH.

WE HEAR THAT . . .

The *NATIONAL RADIATOR CO.* of Johnstown, Pa., has purchased the principal assets of the *VIKING AIR CONDITIONING CORP.* of Cleveland. *MARION L. LEVY*, president of Viking, has been elected a vice president of National Radiator and named general manager of the former Viking operations. The firm now will be known as the Viking Air Conditioning Div. of The National Radiator Co.

Several industrialists and educators were presented with special awards for outstanding service in various engineering fields at the annual banquet of the *AMERICAN SOCIETY OF MECHANICAL ENGINEERS* held last month in New York. Among the recipients were *WILLIAM H. McADAMS* and *MERL BAKER*. The Worcester Reed Warner medal was presented to Professor McAdams "for outstanding contributions to permanent engineering literature." His book, *Heat Transmission*, was singled out as especially meriting the award.

Mr. Baker received the Pi Tau Sigma medal "for outstanding achievement within 10 years after graduation." Many of his papers on heating and air conditioning have appeared in the ASHVE Journal Section of HPAC.

W. R. MARSHALL, JR., associate dean of the College of Engineering and associate director of the Engineering Experiment Station at the University of Wisconsin, has been named recipient of the *WILLIAM H. WALKER AWARD* of the American Institute of Chemical Engineers. The award is given annually in recognition of outstanding technical papers on research in chemical engineering. Professor Marshall received the certificate and plaque at the annual meeting of the institute at St. Louis last month.

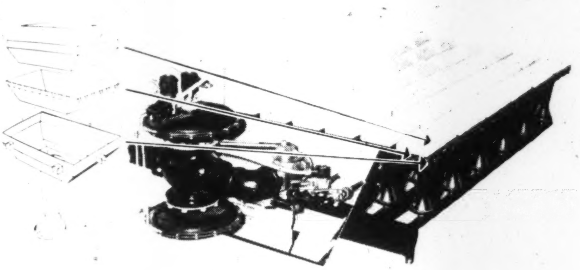
PLANNED AIR EQUIPMENT SALES, INC. and *ENGINEERED AIR ASSOCIATES* of *FRANK J. WEBER & ASSOCIATES* have moved to new offices in Buffalo, N. Y. Address of the new headquarters is No. 7 Upper Terrace, Buffalo 2.

A demonstration of the latest techniques in the welding of aluminum pressure vessels is a feature of the new color film available from *ALUMINUM CO. of AMERICA*. The 28 min 16 mm film, *Welding Advances With Aluminum*, gives a description of welding aluminum using both the tungsten arc and consumable electrode methods. The basic concepts of both methods are explained in an animated sequence. The company's research and process development facilities also are described.

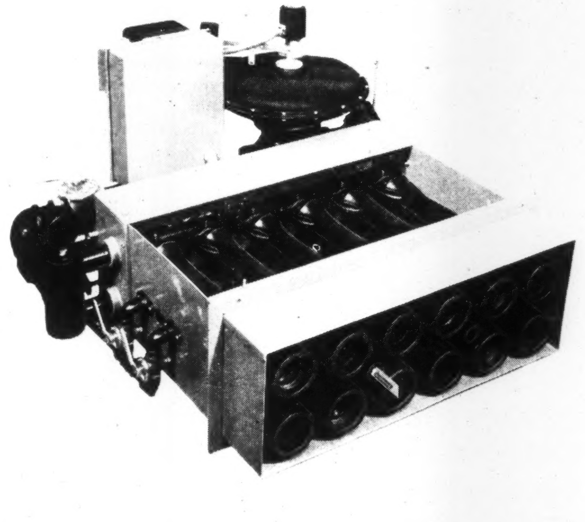
Requests for the film should be made on business letterhead to the Motion Picture Section, 818 Alcoa Bldg., Pittsburgh 19, Pa.

Plans for a series of 10 air conditioning and refrigerating equipment service meetings in 10 cities have been announced by *WORTHINGTON CORP.* The programs will offer coverage of essential information pertaining to the installation and servicing of various types of equip-

for Gas Firing



The UPSHOT TRULIRADIANT GAS BURNER for vertical firing of steel firebox, cast iron and brickset boilers. An outstanding burner with specially designed refractory protection for burner heads insuring long life and providing maximum heat transfer to boiler surfaces for high efficiency.



The HORIZONTAL or TYPE "H" GAS BURNER for Scotch Marine or other type boiler where the "Inshot" type of firing is preferred. Multiple flame retention heads assembled in a heavy gauge housing with balanced air louvres and specifically designed pilots provide the maximum in flexibility and dependability. Complete prewiring and factory assembly of controls simplifies, and cuts hours from installation time.

Write for literature

Gordon & Piatt
P.O. BOX 332
WINFIELD, KANSAS

Kno-Draft recommends Alnor VELOMETER for Precision Air Flow Readings

Ask The W. B. Connor Engineering Corporation how to balance an installation equipped with their Kno-Draft diffusers, and they'll tell you . . . measure the *actual* air delivery—precisely and quickly—with an Alnor Velometer.

Balancing a Kno-Draft equipped installation is a fast and accurate process when using an Alnor Velometer. A few simple readings of the instrument and a twist of the wrist are all that is required to adjust the air flow to the desired amount.

The Velometer is the *only* instantaneous, direct-reading air velocity meter—accurate in all ranges, from high to low—compact, portable, easy to understand and use. Wide assortment of jets and fittings makes this precision instrument ideally suited for all air velocity measurement.

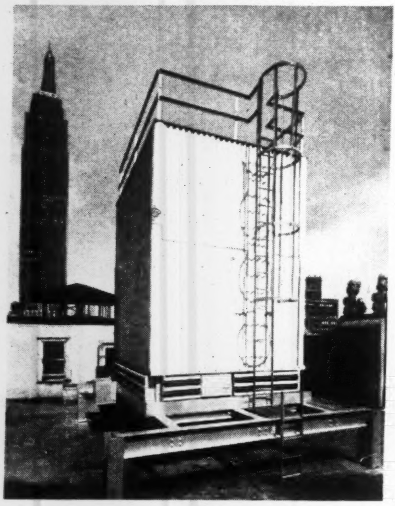
For your air measurement needs, get an Alnor Velometer. You'll save time and money wasted in balancing air distribution on your next installation. If you'd like a copy of the instructions on balancing Kno-Draft diffusers with the Alnor Velometer, just send the coupon below.

Illinois Testing Laboratories
Room 513, 420 N. LaSalle St.
Chicago 10, Ill.

☐ Send Kno-Draft Balancing instructions
☐ Send Velometer Bulletin 2448-G

Name..
Company..
Address..
City..Zone......State..........

Alnor PRECISION INSTRUMENTS FOR EVERY INDUSTRY



When in the market for a low maintenance cost cooling tower call upon the Phillips Cooling Tower Co., Inc.

Towers of wood dry out when not in use and become dangerous fire hazards.

Towers of steel corrode and deteriorate rapidly increasing maintenance costs.

For years the Phillips Cooling Tower Co. Inc. has specialized in corrosion resistant construction.

Phillips cement asbestos towers are the answer to the corrosion problem. Now available in any size or shape to fit building conditions.

Ask for Bulletins PC-207, 208 and 209.

Phillips
Cooling Tower Co., Inc.
220 DUPONT ST., BROOKLYN 22, N. Y.

WE HEAR THAT . . .

[*Continued*]

ment for distributors, contractors and utility organizations. Meetings are planned for Holyoke, Mass., New York, Washington, Atlanta, New Orleans, Kansas City, Los Angeles, Seattle, Chicago and Cleveland.

A $250,000 expansion of plant and manufacturing facilities at *WATSON-STILLMAN FITTINGS DIV., H. K. PORTER CO., INC.*, has been announced. The expansion program includes additional land, buildings, and the installation of specially designed automatic machine tools for increased production of forged steel fittings.

BUSH MFG. CO. has announced the expansion of its product development program and its research and experimentation on basic heat transfer problems. Heading the company's new program is *DR. M. L. GHAI*, who has been appointed director of research and development. Prior to joining Bush, Dr. Ghai was chief of the Heat and Power Div. of the National Physical Laboratory in New Delhi, India. Before that he headed the heating and air conditioning research department of the Pullman-Standard Car Mfg. Co. where he developed a new refrigeration cycle for air conditioning railway cars.

FOSTER WHEELER CORP., manufacturer of heavy equipment for steam power plants, oil refineries and process industries, has begun operations at a new plant at Mountaintop, Pa. The new plant is part of an $8 million expansion and retooling program. Among its major tools are an 8000-ton hydraulic beam press and a 2 million volt x-ray generator capable of penetrating steel 12 in. thick.
Superintendent of the new plant is *KENNETH L. WALKER*. Before being assigned to Mountaintop, Mr. Walker was superintendent of the boiler shop at the Carteret plant of the corporation. He joined the Foster Wheeler organization in 1934 and has specialized in welding and fabrication.

Plant officials of the *KRAMER TRENTON CO.* met with Kramer sales representatives from throughout the country at the recent Eighth All-Industry Refrigeration and Air Conditioning Exposition. Plans for 1954 sales and new products were revealed at the sales meeting by plant officials, headed by *ISRAEL KRAMER*, one of the principals of the firm and *S. CHARLES SEGAL*, general sales manager.

SERVEL'S new line of 1954 air conditioning equipment is being introduced to distributors and dealers at a series of six regional sales conferences this month. Dates and places are as follows: January 4, Los Angeles; January 6, Houston; January 8, Dallas; January 11, Atlanta; January 13, New York; January 15, Chicago.

GENERAL ELECTRIC CO. is planning to build a multi-million dollar hermetic motor manufacturing plant and headquarters at Holland, Mich. Ground will be

B.A.C. EVAPORATIVE CONDENSERS

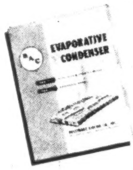
DESIGNED TO
"OUT-PERFORM"
THEM ALL!

WORLD'S WIDEST RANGE

Sizes up to 260 T.R.
in Single, Factory-Assembled Units

Also full line of B.A.C. Cooling Towers

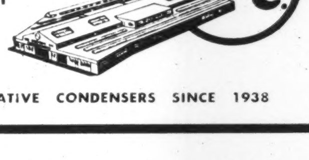
B.A.C. Evaporative Condensers and Cooling Towers are rigidly built throughout for long, trouble-free service. Casings are of galvanized construction, providing full protection against corrosion. Sump pans are hot dipped galvanized after fabrication. Condensing coils are prime surface steel pipe, hot dipped galvanized after fabrication.



Write for FREE Illustrated Book!

"Evaporative Condenser Installation & Operation Manual and Maintenance Manual."

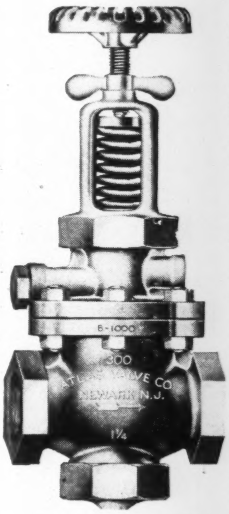
BALTIMORE AIRCOIL CO., INC.
2615 MATHEWS STREET
BALTIMORE 18, MD.



SPECIALISTS IN EVAPORATIVE CONDENSERS SINCE 1938

STELLITED ATLAS

Steam Reducing Valves Type "B"



In our 52-page bulletin 1-A ten pages are devoted to ATLAS Type "B" Reducing Valves. Fig. 112, shown here, is a bronze body reducing valve for 300 pounds steam service. For reduced working pressures from 10 lb. to within 20 pounds of the initial pressure in one stage.

Fig. 114 has an iron body. For initial working pressures from 20 to 250 lb. saturated steam. Reduced: same as Fig. 112.

Fig. 112 (LP) is similar in most ways to Fig. 112 but handles reduced working pressures of ½ to 15 lb.

Fig. 114 (LP) has an iron body. Similar to Fig. 114 but handles reduced working pressures of ½ to 15 lb.

Then come the steel bodies—right from Series 15 to Series 90, for all the way up to 900 lb. pressure with 900° F temperature. Some of them handle reduced working pressures from 10 lb. to within 30 pounds of the initial pressure in one stage and the others handle reduced working pressures from ½ lb. to 15 lb.

ALL ARE STELLITED

The pilot valves are solid Stellite. The pilot valve seats are Stellite faced. In the steel body valves the main valve seat is solid Stellite. Stellite assures long life because it is practically immune to severe abrasion and corrosion.

Type "B" valves are recommended for reducing the pressure of steam where the service demands a tight seating valve and a uniform reduced pressure. Simple to maintain. Main valve and pilot valve are easily removed for cleaning. Entire pilot valve can be lifted out without difficulty.

To get the whole story — cross sectional views — details as to parts — etc. — together with information concerning other ATLAS Reducing Valves for steam, water, air, gas, or, oil:—

Ask for Bulletin No. 1-A

See list of other ATLAS regulating devices below.

ATLAS VALVE COMPANY
REGULATING VALVES FOR EVERY SERVICE

276 SOUTH STREET **NEWARK 5, N. J.**

Represented in Principal Cities

- Campbell Boiler Feed Regulator
- Damper Regulators
- Temperature Regulators
- Exhaust Control Systems
- Back Pressure Valves
- Float Valves
- Pressure Regulators
- Pump Governors
- Balanced Valves
- Control Valves
- Oil Control Cocks

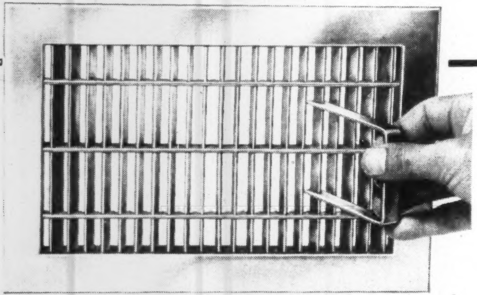
You can be sure of safe, dependable air distribution

when you

Specify and Install

R & G

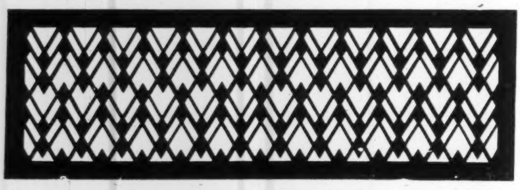
REGISTERS and GRILLES



SOLID BAR TYPE GRILLES AND REGISTERS

Designed for the job where performance and quality are the first consideration. They are found in America's finest Schools, Hospitals and Public Buildings.

- Fixed or with Horizontal, Vertical adjustment.
- TAMPERPROOF and KICKPROOF. Built to withstand abuse.
- Easily adjustable with special tool provided.
- Interlocking Cross Bars for added strength.
- Available in various types of electroplating.
- Single or Double deflection.
- Constructed of solid 14 gauge Steel bars.



81 STYLES OF PERFORATED GRILLES.

Complete Line of Registers and Grilles for
HEATING • VENTILATING • AIR CONDITIONING
Catalog on Request

REGISTER & GRILLE MFG. CO., INC.
70 BERRY STREET, BROOKLYN 11, N. Y.

WE HEAR THAT . . .

[*Continued*]

broken next spring and manufacturing will start early i 1955. The plant will employ more than 400 persons.

A large new plant which will be used entirely for expanded manufacturing of appliance controls was dedicated last month in Burbank, Calif, by *GENERAL CONTROLS CO.* A leading feature of the dedication was a 240-f panoramic exhibit showing, with graphic displays and working appliances, the numerous functions automati controls play in the American way of living.

The *NATIONAL HEATING WHOLESALERS ASSOCIATION, INC.* has moved to Suite 921, Builders Bldg., 228 N. LaSalle St., Chicago 1.

WILLIAM BYNUM, executive vice president of Carrier Corp., has been elected a director of the *NATIONAL ASSOCIATION of MANUFACTURERS.* Mr. Bynum has been with Carrier for the past 23 years.

WALTER H. WOODING, Superintendent Metals Section, Industrial Test Laboratory, Philadelphia Naval Shipyard, has been named the winner of the 1953 Lincoln Gold Medal awarded by the *AMERICAN WELDING SOCIETY*. The award was presented for his paper, "The Inert-Gas-Shielded Metal-Arc Welding Process."

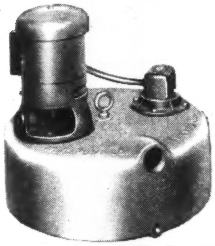
The *BILLINGS & SPENCER CO.* has purchased the majority of the common stock of the *PECK, STOW & WILCOX CO.* The "Pexto" board of directors resigned with the exception of *MARK J. LACEY*, president, and *SAMUEL G. WILCOX*, executive vice president. The new board consists of the present directors of Billings in addition to Mr. Lacey and Mr. Wilcox.

At the 34th annual meeting of the *AMERICAN WELDING SOCIETY* in Cleveland, awards were presented for the A. F. Davis Undergraduate Welding Award program of the Lincoln Electric Co. Awards were presented to *ROGER C. WAUGH* and *OTTO P. EBERLIN* of Cornell University and *WAYNE JACOBS* and *CHARLES MARSHALL* of the University of Wisconsin.

Recently *FRANK H. ADAMS*, president of Surface Combustion Corp., was given the distinguished service award of the *GAS APPLIANCE MANUFACTURERS ASSOCIATION* for his achievements as a "pioneer in the development of gas as a tool now employed in more than 26,000 industrial processes." The award was made by the trade group's industrial gas equipment division during the annual meeting of the association in St. Louis.

JAMES F. DONNELLY, vice president in charge of sales for Servel, Inc., was elected a director of the *AMERICAN GAS ASSOCIATION* at its recent annual convention. Mr. Donnelly, who has been active in gas industry affairs for many years, last year was president of the Gas Appliance Manufacturers Association.

LOW PRESSURE SYSTEM *Condensate Pumps*

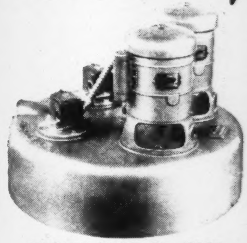


SINGLE UNIT—Fig. 302A
10 Gal. Receiver for Single Units
Diameter 21″
Hgt. of Return above floor 6⅞″

Capacities 500 to 10,000 sq. ft. E.D.R.

weil TVC PUMP

LOW RETURN CONNECTION
LOW SPEED, LONG LIFE
CAST IRON RECEIVER
LOW WATER LINE
ELECTRODE OR FLOAT SWITCH CONTROL



DUPLEX UNIT—Fig. 303B
15 Gal. Receiver for Single or Duplex Units
Diameter 25½″
Hgt. of Return above floor 7$\frac{3}{16}$″

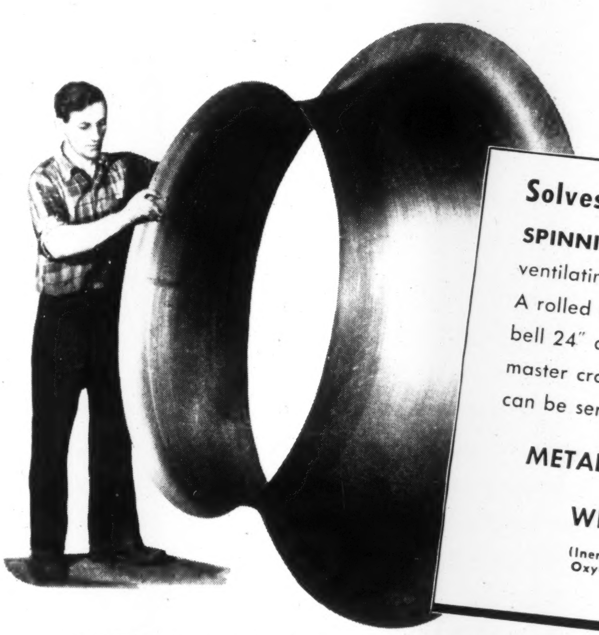
TVC SELECTION TABLE

Unit Number	Max. Sq. Ft. E.D.R.	Discharge Pressure At Pump	G.P.M. From Radiation	Cap. of Pump	H.P. of Motor	Return Inlet	Pump Discharge	Dia. of Receiver	Height of Unit
TVC 13	500	20 lbs.	.25	1.0 GPM	1/4	2″	1″	21″	21″
TVC 19	750	20 lbs.	.38	1.5 GPM	1/4	2″	1″	21″	21″
TVC 23	1000	20 lbs.	.5	1.5 GPM	1/4	2″	1″	21″	21″
TVC 29	2000	20 lbs.	1.0	3.0 GPM	1/4	2″	1″	21″	21″
TVC 35	4000	20 lbs.	2.0	6.0 GPM	1/4	2″	1″	21″	21″
TVC 41	6000	20 lbs.	3.0	9.0 GPM	1/2	2″	1″	21″	23½″
TVC 47	8000	20 lbs.	4.0	12.0 GPM	1/2	2″	1″	25½″	23½″
TVC 52	10000	20 lbs.	5.0	15.0 GPM	3/4	2″	1″	25½″	27½″

See Bulletin TVC-300-C for Full Specifications

Intermediate Sizes Based Upon Discharge Pressure Required Are Available.

weil PUMP CO. 1514 NORTH FREMONT ST., CHICAGO 22



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Solves Production-Forming Problems Like This—

SPINNING "jumbo" sized forms like this inlet bell for a large ventilating blower is no problem the PHOENIXSPUN way! — A rolled and welded sheet of 14-gauge steel becomes an inlet bell 24″ deep and 72″ in diameter, under the skilled hands of master craftsmen. Large or small, your special forming needs can be served as readily.

METAL SPINNING

WELDING
(Inert Gas, Arc, Oxy-Acetylene)

DEEP DRAWING
(To 350 Tons)

FABRICATING

ASSEMBLING

WRITE for Illustrated Bulletins, or send prints and specifications for prompt quotations.

Metal Spinning Div., **PHOENIX PRODUCTS CO.**

4707 N. 27TH STREET • MILWAUKEE 16, WISCONSIN

WHO'S WHAT . . .

HAROLD W. SWEATT, president of *MINNEAPOLIS-HONEYWELL REGULATOR CO.* since 1934, has been elected chairman of the board. He succeeds *MARK C. HONEYWELL*, who was named honorary chairman. *PAUL B. WISHART*, vice president and general manager of the company, was elected to succeed Mr. Sweatt as president.

At the same time two other officers of the company were elected directors. The new directors are *TOM McDONALD*, vice president in charge of sales, and *A. M. WILSON*, vice president in charge of the aeronautical division.

The changes were made as a result of several officials retiring under the company's executive retirement plan. Mr. Honeywell and *W. L. HUFF*, who is retiring as executive vice president, will continue as directors of the company.

New officers of the *NATIONAL WARM AIR HEATING and AIR CONDITIONING ASSOCIATION* elected at the 40th annual convention last month are: President, *C. B. PHILLIPS*, vice president, Surface Combustion Corp.; first vice president, *G. W. DENGES*, vice president, Williamson Heater Co.; second vice president, *F. L. MEYER*, president, Meyer Furnace Co.

New members elected to the board of trustees are: *E. A. EICHENBERGER*, general manager, F. Meyer & Bros.; *C. L. SAPP*, president, Farquhar Furnace Co.; *J. F. DEANE*, general manager, International Sales Co., *S. J. LEVINE*, manager, Residential Heating Div., General Electric Co.

PETER L. LOEWE has been named vice president and assistant secretary, and *M. E. STERN*, vice president and assistant treasurer, of *BROOK MOTOR CORP.*, Chicago. Brook is a newly organized subsidiary of Brook Motor, Ltd., England, manufacturer of a line of a-c electric motors. The Chicago company will direct introduction and sales activities in the United States and Central American markets.

WAGNER ELECTRIC CORP. has announced the election of *EDWARD G. HOLTZMAN* as assistant secretary and assistant treasurer of the company. He succeeds L. W. McBride, who has accepted the position of executive vice president of Paxton and Gallagher Co. in Omaha. Since joining the company in 1942, Mr. Holtzman has been associated with industrial relations activities and at the time of his appointment was labor relations manager. Succeeding him in that position is *TRUMAN L. KING*. Taking over Mr. King's duties as personnel relations manager is *R. A. WEISKOPF*.

Reassignments of duties of production and engineering personnel at *SERVEL, INC.* to consolidate civilian and defense production have been announced by *THEODORE*

GET NON-CLOG PUMP PERFORMANCE
at "ordinary" pump prices—with the
AMERICAN-MARSH NKS vertical wet pit pump

Now — at no more than the cost of ordinary pumps — you can get full *non-clog* performance with the American-Marsh NKS! On vertical wet pit applications, the NKS delivers remarkably high efficiency, handling clear liquids or liquids with solids up to three inches in diameter.

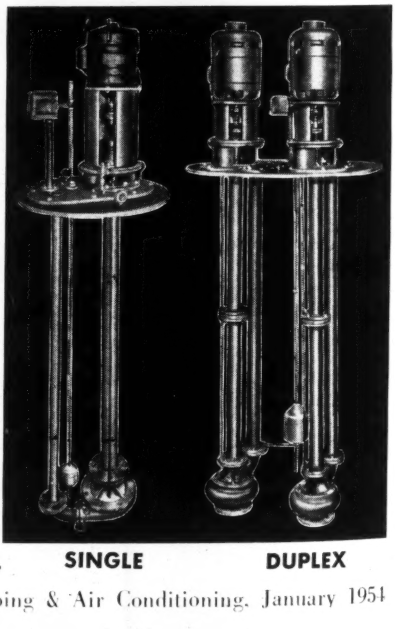
You'll also find it extremely versatile in application. You can get both single and duplex models with wetted parts furnished in standard iron, bronze or special alloys. Numerous items of optional equipment further increase adaptability to special requirements.

The NKS Pump is moderately priced . . . and like *every* American-Marsh Pump, receives a complete operating test before shipment. So when you specify sewage and sump pumps, be sure you get the *extra performance* American-Marsh Pumps deliver . . . *at no extra cost!*

For complete specifications —
WRITE FOR
BULLETIN 325-A.
Models from 25 to 800 GPM at heads from 10 to 60 feet.

"*Pumps — and Pumps Only — Since 1873*"

AMERICAN-MARSH PUMPS
BATTLE CREEK MICHIGAN
In Canada:
American-Marsh Pumps (Canada) Ltd., Stratford, Ont.



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"CORRECT PRACTICE in INDUSTRIAL PIPING"

— All-New Second Edition —

196 Pages — 8½" x 11" — $1.50

This practical book is made up of outstanding papers and data on industrial piping selected from past issues of "Heating, Piping & Air Conditioning." It is a most comprehensive collection of case studies, showing how various difficult piping problems encountered in different industrial plants were successfully worked out by piping experts.

Design, installation, operation, and maintenance . . . steam, air, gas, oil, process, water and refrigeration piping . . . piping in pulp and paper and steel mills, in automobile plants and breweries, in the food and chemical and textile industries, and in many other types of manufacturing plants are dealt with from many different angles.

Send $1.50 today for this book to the address below.

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6 North Michigan Ave. Chicago 2, Illinois

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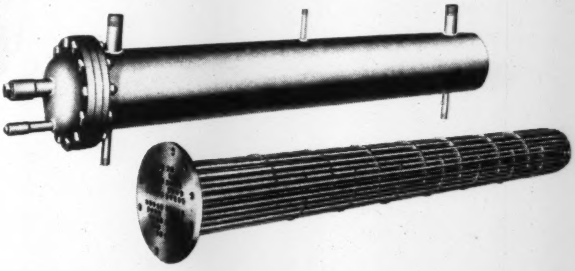
Taco
"CONTROLLED VELOCITY" CHILLERS

1. Improved heat transfer
2. Rapid response to Thermal Expansion Valve
3. No oil logging and slop over



Because . . .
TACO'S "CONTROLLED VELOCITY" TUBE BUNDLES

Carry *all* incoming liquid to the top of the Chiller in the first pass.

Provide constant forward movement of *all* refrigerant and oil.

Prevent accumulation of liquid (refrigerant or oil) in any part of the Chiller.

And because . . .
TACO'S "CONTROLLED VELOCITY" HEADS . . .

Agitate oil and liquid refrigerant, at each head pass, with a constant stream of expanding gas.

Provide unretarded flow of refrigerant.

Eliminate "traps" for oil and liquid refrigerant

For full information and Taco's "pin-point" Selection Charts, write for Bulletin CWF.

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TACO HEATERS INCORPORATED
137 South Street Providence 3, R. I.

Fans FOR EVERY Industry

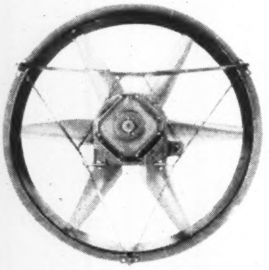
SOUTH BEND
SOUTH BEND AIR PRODUCTS INC
INDIANA

AEROSPOT
and
DYNAFLOW

Aerospot and *Dynaflow* fans rate high in efficiency and safety features . . . offer advanced aerodynamic design and rugged construction. The models shown enjoy wide popularity with industrial users. Any unit may be furnished with **explosion-proof** motor and fan blades.

HEAVY DUTY AEROSPOT

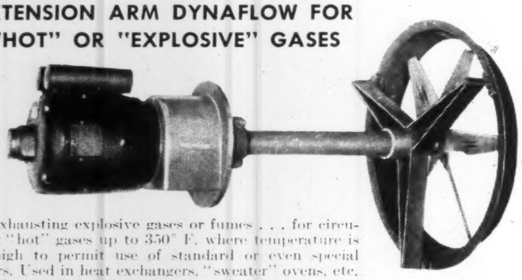
For general or specific ventilation, man-cooling, or parts-cooling . . . to increase personnel efficiency and reduce lost time in cooling and drying hot parts. Portable . . . direction of blast adjustable. Explosion-proof motor, metal conduit and starter can be supplied. Conforms to state safety regulations.



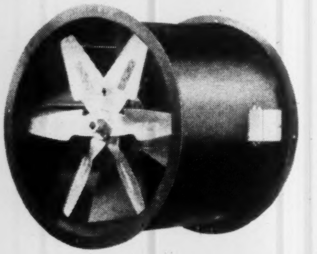
DYNAFLOW UNITS
2-4-6 BLADE TYPES

Six blade model illustrated. For exhausting or blowing against high static pressures. For general ventilation or specific processes where fumes are present. Sizes: 16″ to 36″ diameter. Capacities: 1240 to 26000 c.f.m. Two and four blade models available for applications at lower static pressures.

EXTENSION ARM DYNAFLOW FOR "HOT" OR "EXPLOSIVE" GASES



For exhausting explosive gases or fumes . . . for circulating "hot" gases up to 350° F. where temperature is too high to permit use of standard or even special motors. Used in heat exchangers, "sweater" ovens, etc. Fans from 16″ to 36″ diameters.



DUCTYPE UNITS
Direct Drive or Belt Drive

Direct drive model shown, also supplied with belt drive for high temperatures or corrosive air and gas handling. Designed for bolting in any duct run at any point or at either end. Sizes: 16″ to 36″ fans.

Send for complete specifications and listings of other fans available.

WRITE FOR CATALOG

SOUTH BEND AIR PRODUCTS, Inc.
322 EAST COLFAX AVENUE • SOUTH BEND 22, INDIANA

WHO'S WHAT . . .

[*Continued*]

W. RUNDELL, vice president in charge of operations. Production personnel who have been given new assignments are: *HERMAN KRAEMER*, former works manager, has been transferred to special assignment duties directly under Mr. Rundell; *E. G. SCHIFF*, former assistant works manager, has become manager of civilian production; and *JOHN DAVIDSON*, former assistant works manager for the wing division, is now manager of all defense production operations.

In the engineering division, *DR. ROBERT S. TAYLOR*, chief engineer, has been appointed director of quality control for the company. Dr. Taylor's former duties have been reassigned to two other men. *DR. CARL T. ASHBY*, former assistant chief engineer of refrigerators and freezers, has been appointed chief engineer for those products. *A. C. STUART*, former assistant chief engineer of defense engineering, is now chief engineer of that department.

LEE MERKEL has been named director of sales for the *BRUNER CORP.*, in Milwaukee. Mr. Merkel was formerly vice president in charge of the eastern division of Electro-Way Corp., Los Angeles. He served on the Industry Advisory Board of the National Production Administration and the Excise Tax Committee of the NEMA during 1950 and 1951.

New assistant sales manager of the Industrial Insulation Div. of the *PHILIP CAREY MFG. CO.* is *JAMES W. BARTLETT, Jr.* He joined the organization in 1940 as a sales trainee. In 1951 Mr. Bartlett was appointed sales supervisor of the Cleveland district and served in that capacity until his recent assignment.

FRANK HUDIK, president of Comfortair Co., Hackensack, N.J. has been named chairman of a new *AIR CONDITIONING REQUIREMENTS COMMITTEE* of the Federal Housing Administration. The appointment was made on nomination of the Refrigeration Trade Assoc. of Washington, D.C. Other members of the committee serving with Mr. Hudik are *FRED BONALL*, president of the Bahnson Co., Winston-Salem, N.C.; and *JAMES L. HOYER*, a consulting engineer of Washington, D.C.

MATTHEW J. BETLEY is the new vice president and general manager of *AEROQUIP CORP.* He joined the organization in 1952 and was named vice president in charge of manufacturing in 1953. In his new post, Mr. Betley will be responsible for sales, engineering, financial and manufacturing functions.

The *YOUNGSTOWN SHEET and TUBE CO.* has announced the appointment of *JOSEPH C. ANTON* as superintendent of construction at the Indiana Harbor plant in Gary. He was appointed to succeed Ed Haak, who retired some time ago. The company also has announced the appointment of *FRANK A. ROBERTS* as manager of

FAMOUS LAST WORDS:

"they wouldn't dare"

That's what they said the day before Pearl Harbor. Remember? But by now you'd think people would have learned. Let's face it—we must be ready for disaster at any moment. It may be an atom bomb—or it may be a fire, a flood, a hurricane. It's only common sense to be prepared for it, whatever it is. Take these precautions TODAY:

☐ **Enlist the help** of your local Civil Defense Director.

☐ **Check contents** and locations of first-aid kits.

☐ **Send staff** to Red Cross courses. They may save your life.

☐ **Promote preparedness** in your community. Your local CD Director can show you how.

Set the standard of preparedness in your plant city—check off these four simple points NOW.

A PUBLIC SERVICE PROJECT · THE ADVERTISING COUNCIL

CD

WHO'S WHAT . . .

(Continued)

Organization Planning, a new unit in the Industrial Relations Dept.

DR. JOHN A. ANTHES has been appointed sales project engineer for the Machinery Div. of *DRAVO CORP.* In this position Dr. Anthes will direct the company's activities in the chemical field. He was formerly chief chemist at the Bridgeville plant of American Cyanamid Co.

RICHARD A. MECK has joined the Multi-Vent Div. of the *PYLE-NATIONAL CO.* Mr. Meck, formerly planning production and design engineer for Victor Adding Machine Co., was a sales engineer and design engineer with the Multi-Vent Div. from 1947 to 1950.

ALLEN D. FOOTE has been appointed works purchasing agent for the West Allis Works of *ALLIS-CHALMERS MFG. CO.*, a new post covering the company's general machinery and tractor division activities. Mr. Foote joined the company in 1936 and became associated with the purchasing division in 1942.

EMIL T. JOHNSON has been appointed director of production and engineering for the *UNION ASBESTOS and RUBBER CO.* For the past year he has served as head of production and engineering of the company's fibrous products division. Mr. Johnson's new duties will entail the general supervision of all production and engineering.

PAUL O. BANCROFT now is account supervisor of the Air Conditioning and Refrigeration Div. of *WORTHINGTON CORP.* Mr. Bancroft will assume responsibility for all air conditioning and refrigeration advertising and sales promotion.

A. J. DIEBOLD, JR. has been elected a director of *SAUER, INC.*, mechanical contractors engaged in heating and air conditioning in Pittsburgh. Mr. Diebold is president of Forest Lumber Co.

The formation of the firm of *JOHN G. HOAD and ASSOCIATES* at Ann Arbor, Mich., has been announced. *DON M. FERRIS* is the principal associate. The new organization will specialize in the design and construction of industrial power and boiler plants, industrial heating and ventilating installations, electrical generating and distribution facilities.

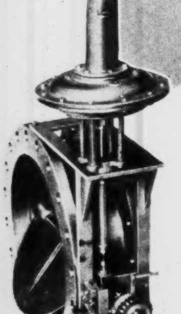
R. B. CREAN has been appointed vice president of the *INGERSOLL PRODUCTS DIV.* of *BORG-WARNER CORP.* Mr. Crean will retain his title of assistant general manager of the division. *HOWARD A. SCHMEAL* has

for Air Conditioning • Heating • Ventilating • Water Piping

you need

ROCKWELL VALVES

For Air – Gas – Liquids – Solids



W. S. Rockwell standard butterfly valve with air diaphragm operator, declutching mechanism and handwheel.

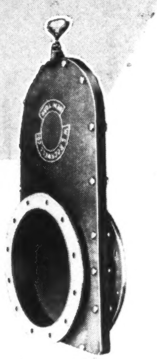
W. S. Rockwell wafer type butterfly valve with hand lever control.

For uniform, quick control and shut-off, manually or automatically—

For minimum pressure drop when valve is fully open—

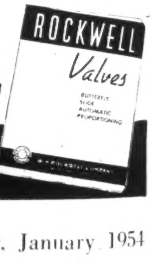
You're sure, you're safe with Rockwell butterfly or slide valves—always dependable.

TIGHTNESS—commercial, air- or drip-tight.
CONSTRUCTION—as required.
PRESSURE—to 300 p.s.i.
TEMPERATURE—as high as 2000° F.
CONSTRUCTION—of any metal or rubber-lined.
CONTROL—lever, hand or chain wheel, air diaphragm or cylinder, electric motor, solenoid, etc.
SIZES—from 1" to 120" pipe diameter.



W. S. Rockwell standard slide valve with pull handle; available also with hand lever, handwheel or chain wheel.

Get our Valve Catalog



W. S. ROCKWELL COMPANY
2543 ELIOT STREET • FAIRFIELD, CONN.

WHO'S WHAT . . .

[*Continued*]

been named secretary and treasurer of the Ingersoll division. He previously was treasurer and controller. *ROBERT F. SCHUTZ*, assistant treasurer, has been given the additional title of assistant secretary.

KENNETH C. DAVIDSON has been named sales promotion manager for *DRAYER-HANSON, INC.* Mr. Davidson will head a new sales promotion department under *A. L. HANSON*, vice president in charge of sales and engineering. Just released from active duty with the Army, he was engaged in advertising and sales promotion work before being recalled to the service.

Another appointment at Drayer-Hanson is that of *JOSEPH ABDO* as chief engineer for all divisions of the firm. He was promoted from the Automatic Controls Div. Prior to joining the firm in 1952, he was associated with Minneapolis-Honeywell Regulator Co.

JOHN E. HAINES, vice president of the Minneapolis-Honeywell Regulator Co., has been appointed to the *BUILDING RESEARCH ADVISORY BOARD*, a division of the National Academy of Sciences. The advisory board is a coordinating and fact-finding organization created to advance technical knowledge in all phases of the building industry. Members include executives of firms directly connected with the building industry, government officials and members of engineering school faculties.

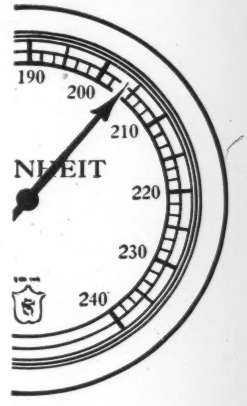
STEPHEN C. BIXBY has been appointed operations manager of *MINNEAPOLIS-HONEYWELL REGULATOR CO.'s* new Appliance Controls Div. plant at Gardena, Calif. He formerly was chief of mechanical design for the company's Heating Controls Div. in Minneapolis.

DONALD L. HARWOOD has been appointed general purchasing agent of *FAIRBANKS, MORSE & CO.*, with headquarters in Chicago. Mr. Harwood has been with the company since 1926.

HARRY G. JOHNSON, formerly a manufacturer's representative in Atlanta, has recently been appointed general manager for *KLEMM AUTOMOTIVE PRODUCTS CO.*, Chicago manufacturers of automotive and fuel oil filtering equipment. Mr. Johnson has represented the firm in the southeast part of the country for many years.

The appointment of *WILLARD B. OTT* to the position of assistant sales manager, Building Products Div. of the *PHILIP CAREY MFG. CO.*, has been announced. In his new position Mr. Ott will be concerned with the distribution of "Thermo-Bord", a structural and insulating panel.

JACKSON and CHURCH CO. has named *ALFRED C. DROUILLARD* manager of furnace development. Mr. Drouillard will be responsible for further development



if high fuel oil temperatures are what you need—the

Paracoil TYPE "GF"*

INDIRECT GAS FIRED FUEL OIL HEATER

is the answer!

With sub-water-line oil heaters, a low circulating boiler water temperature can play havoc with even the best engineered No. 6 oil burner layouts—particularly with the viscous oils now being used!

Our Type "GF" Indirect Gas Fired Heater can give you any desired oil temperature you want—without the use of expensive electric boosters!

APPLICABLE TO ALL TYPES OF OIL FIRED APPARATUS!

As it is not dependent upon the unit it is servicing for the means of heating the oil, the Type "GF" Heater can be applied to any oil fired apparatus, be it a steam or hot water boiler, a process oven, a dryer or a kiln!

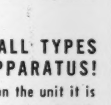
ONE HEATER CAN SERVE MANY BURNERS!

No steam piping required. Heater operates on a closed, internal steam and condensate cycle!

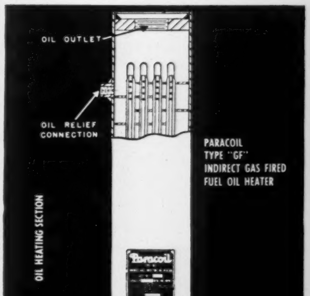
CHECK THESE FEATURES!

Completely factory assembled • Easy to install anywhere, even outdoors • Requires only minimum of floor space • Economical to operate • Wide range of oil heating capacities • Burns any specified type of gas fuel • High oil temperatures at all times • Operation unaffected by normal variation in viscosities of oils being heated.

Write today for BULLETIN 60-L



Approved by
Board of Standards
and Appeals City of New York



*Patents Pending

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CORPORATION
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Here is the **NEW**

Sterlco

Sterlco
LOW-BOY

CONDENSATE RETURN PUMP

SERIES 5200 Cast Iron TANK
•
Also Available SERIES 5100 Steel Tank

For SMALL LOW PRESSURE APPLICATIONS

- **COMPACT** (less than 1½ sq. ft.)
- **LOW RETURN** (less than 7" from floor)
- **LOW COST** (because of simplicity)

SIMPLE to INSTALL Single electrical connection. Built-in counter-operated switch. One permanent setting for jobs up to 3000 sq. ft. Discharge connection may be rotated to four 90° positions.

SIMPLE to SERVICE No packing glands, rotary seals, O-rings on either pump or switch. Entire pump, motor, and switch unit can be easily lifted out of tank for inspection.

Sterlco THERMOTROL

COLD
NORMAL

Rugged, dependable, automatic, individual radiator temperature control. Easily set to desired temperature—maintains it by modulating the flow of steam or hot water to the radiator in balance with air temperature. Self contained — easily installed without wiring or external connections.

Adaptable to Zone Control in Radiant Heat Systems — ask for details.

STEAM HEATING is MODERN, EFFICIENT and DEPENDABLE

Sterlco Products Distributed through
LEADING HEATING and PLUMBING WHOLESALERS

STERLING, INC.

3732 N. Holton St., Milwaukee 12, Wisconsin

CONDENSATION AND VACUUM PUMPS

HEATING SPECIALTIES

TEMPERATURE CONTROLS

WHO'S WHAT . . .

[*Continued*]

and modification of the firm's furnaces, with emphasis on designing and perfecting new gas fired equipment.

New general sales manager for the *FLEXIBLE TUBING CORP.* is *ADELBERT H. LOUX*. Mr. Loux joined the company in 1949 as manager of distributor sales.

MARLOW PUMPS has announced the appointment of *HAROLD HINNES* as manager of the company's newly created service department. The new department will have charge of dealer and customer requests for parts, repairs and service information.

HORACE I. SCHMIDT recently was appointed sales manager of *HALSTEAD & MITCHELL*. He will direct sales and field engineering of cooling towers and counterflow cleanable condensers in the United States. Mr. Schmidt had been a manufacturers' representative.

ROGER O. BAY has been elected a vice president of the *BONNEY FORGE & TOOL WORKS*. Mr. Bay will continue to serve as sales manager of the Tool Div., a position to which he was appointed in May of this year. Prior to that he was sales manager of the Automotive Div., Cleveland Pneumatic Tool Co.

IN THE TERRITORIES . . .

For *JOHNSON SERVICE CO.*—Four new branch offices at Champaign, Ill., Lubbock, Texas, and Miami and Pensacola, Fla. *R. F. BRUNING*, formerly of the Peoria office, has been appointed sales engineer in charge of the Champaign branch serving east central Illinois. The Lubbock branch is in charge of *CHARLES J. SELASKY*, sales engineer, formerly of the Dallas branch. His office will serve northwest Texas. *JAMES E. BEARD* transfers from the Jacksonville office to become sales engineer in charge of the new Miami office serving southern Florida. Transferring from the Birmingham office, *WALTER WILLIAMS* is representative in charge at Pensacola. His territory will cover southern Alabama and northwestern Florida.

For *MAID-O'-MIST, INC.*—*R. C. SCHNEIDER CO.* of Wauwatosa is the new representative for Wisconsin.

For *REYNOLDS METALS CO.*—New distributor for aluminum mill products in the Cleveland area is *KASLE STEEL CORP.*, 8550 Brookpark Rd., Cleveland 29.

For *ALDRICH CO.*—An associated group of manufacturers' agents will represent the company in New England. *PARKER H. DEVLIN*, formerly New England manager for McDonnell & Miller, Inc., will represent the firm in Connecticut and the western part of Massachusetts; *J. L. McARDLE*, Rhode Island and the eastern part of Mas-

Your Only Source of Alloy Backing Rings

......Prime source of supply for Backing Rings in All Metals

Plain Type Also Available in All Metals

CHROME-ALLOY SERIES

TYPE	CHROME CONTENT	MOLY CONTENT
P-12	1%	½%
P-11	1¼%	½%
P-22	2¼%	1%
P-5	5%	½%

18-8 Stainless Steel—347-CB, 304, 310, 316, 321
Aluminum—3-S-H14 (ASTM)
Copper—B256 (ASTM)
Wrought Iron

Robvon Backing Rings, in "C-Nub" and Plain Types, are the only Welding Backing Rings available in alloy metals.

SAVE MORE THAN 50% fit-up preparation—SAVE materials—SAVE on maintenance and replacement costs.

100% EFFICIENCY—Time, Labor and Materials.

PERFECT JOINTS—PERFECTION PROVED by X-Ray, Radiograph or Gamma Ray inspection.

Approved by USCG, USMC, AWS, PFI, ABS and other U. S. Government agencies.

Iron Pipe and Spiral-Weld Pipe and Tube sizes—¾" to 60". "NUB" Spacer Root Openings are ⅛", 3/16" and ¼".

Try them—you'll be glad you did.

Send for Catalog and Data Sheets.

2762

ROBVON *Industries, Inc.*
675 GARDEN ST., ELIZABETH, N. J.

Residential AIR CONDITIONING *Without Water!*

UNICON

by KRAMER

A Remote Type Air-Cooled Condenser that completely eliminates water, sewerage and plumbing problems.

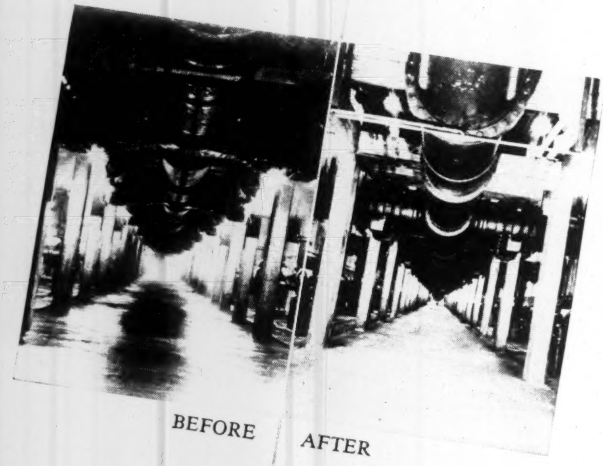
SPECIFICALLY DESIGNED FOR RESIDENTIAL APPLICATION

Unusually Quiet!

WRITE FOR BULLETIN No. U 250

KRAMER TRENTON CO.
Trenton 5, N.J.

how
pipe galleries stay dry



surrounded by cold water

The pipe galleries in Chicago's water filtration plant are surrounded by Lake Michigan water, as cold as 40° F. Before Kathabar, condensation literally created a fog in the galleries, corroded expensive equipment, rotted wiring, peeled off paint.

Moisture removal by refrigeration was impractical under the conditions prevailing. Kathabar dehumidifying units completely dried up the galleries by lowering the dew point of the air. Eliminating the condensation damage, the Kathabar units pay for themselves in less than 3 years.

This is one of the many contributions of Kathabar humidity engineering. It is used for the packaging, processing, storage, and testing of many products. By preventing frost, condensation, corrosion, and supplying direct dehumidification, Kathabar saves money and improves product quality.

Wherever atmospheric moisture is a problem, Kathabar engineers will be glad to help you find a cost-saving solution.

Write for literature
Group K-53-4.

Kathabar
HUMIDITY CONDITIONING

SURFACE COMBUSTION CORP., TOLEDO 1, OHIO
ALSO MAKERS OF
Surface INDUSTRIAL FURNACES Janitrol AUTOMATIC SPACE HEATING

WHO'S WHAT . . .

[*Continued*]

sachusetts; and *WALTER A. GUSTAFSON*, Maine, New Hampshire and Vermont.

For *MARLO COIL CO.*—West coast representative is *PACIFIC ENGINEERING EQUIPMENT CO.*, Los Angeles.

For *ARTHUR A. OLSON & CO.*—*HARRY B. SCHLOSSER*, former president and general manager of the Lee Corp., has been named representative for the Olson company in Philadelphia and Baltimore. Mr. Schlosser has formed the *HARRY B. SCHLOSSER CO.* with offices in Wilmington, Del.

For *SALL MOUNTAIN CO.*—*ROBERT M. STROUD* is the new representative for Michigan and northern Ohio. Mr. Stroud will make his headquarters in Detroit.

For *PYLE-NATIONAL CO.*—Three new manufacturers' representatives for the "Industrial Multi-Vent" line are: *A. J. PITTMAN*, 313 Shades Crest Rd., Birmingham, Ala.; *GEORGE E. MEAD CO.*, Arctic Bldg., Seattle, Wash.; and *WAIN ENGINEERING CO.*, 2311 Douglas St., Omaha, Neb.

For *HAMMEL-DAHL CO.*—New sales representative is the *ARTHUR B. ANDERSON CO.*, 1134 W. 31st St., Minneapolis, Minn. covering the states of Minnesota, North Dakota, South Dakota and parts of Wisconsin.

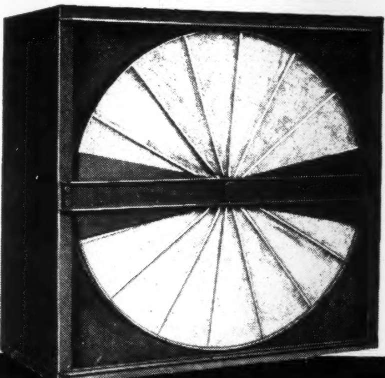
For *EDWARD VALVES, INC.*—*REX E. GALLOUP* is district manager for the Texas and Gulf Coast area. His chief responsibility will be to direct sales of the new "Mudwonder" valve. Mr. Galloup's headquarters are at 1610 Morst St., Houston.

For *FRICK CO.*—*D. B. THOMPSON* now is a sales representative with headquarters at 1970 Allison St., Denver 11, Colo. He will travel throughout the Rocky Mountain states.

For *LAMSON CORP.*—*WALTER F. SCHULTZ* has been promoted from Syracuse contract engineer to Cleveland regional engineer. As regional engineer, Mr. Schultz will supervise the engineering on all Lamson products.

For *FARR CO.*—*AIR FILTER SALES & SERVICE CO., INC.*, of San Francisco, has been appointed sales and service representative for northern California. The firm has been a "Far-Air" distributor for the past five years.

For *SARCO CO.*—A new sales office at 35 Elmira St., San Francisco, will represent Sarco in northern California. *J. S. SPEAR*, sales manager of the new branch office, has



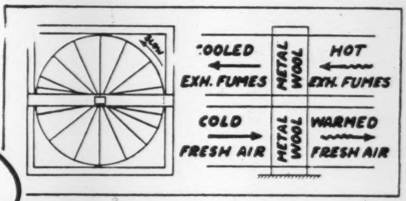
HOLD DOWN HEATING OR COOLING COSTS!

THERM·O·WHEEL

holds heat or cold while exchanging air!

Now, with THERM-O-WHEEL, smaller heating or cooling units can serve a greater area . . . your present systems can be run more economically, with constant ventilation.

HERE'S HOW:



Therm-O-Wheel retains up to 96% of heat or cold by utilizing the "counterflow" principle. The rotating metallic wool in counterflowing air streams permits almost complete transfer of temperatures between exhaust and fresh makeup air. Therm-O-Wheel operates efficiently in any degree of temperature-difference between the two air streams. Ideal for theatres, assembly halls, industrial, chemical and brewing operations, etc.; winter or summer ventilating.
Write for complete details.
Some territories for distributors still open

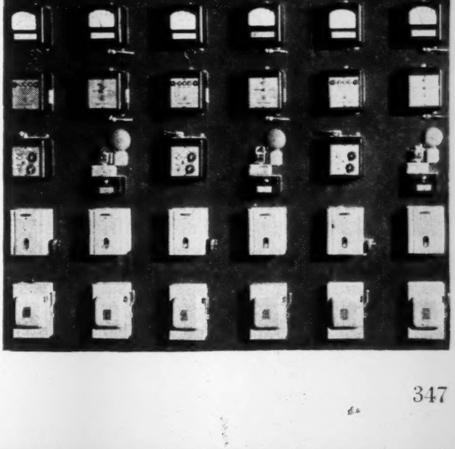
THERM O WHEEL
INCORPORATED

THERM-O-WHEEL, INC.

1042 Twenty-second St., Far Rockaway, N.Y.

Military base equipped with Perfex instruments

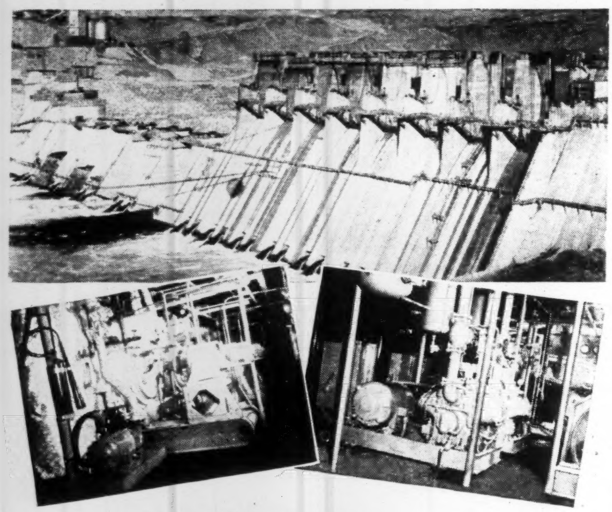
Panelboard below, with three sets of Perfex Instruments, automatically controls three boilers.



Bases throughout the nation are now stretching fuel supplies and helping conserve our natural resources with Perfex Industrial Instruments. O'Hare Field is one of the most recent military installations. Send for latest bulletin on money-saving controls for gas, oil, or stoker-firing.

PERFEX
INDUSTRIAL INSTRUMENTS

PERFEX CORPORATION, MILWAUKEE, WISCONSIN • In Canada, Perfex Controls, Ltd., Guelph & Toronto 1



How **VILTER** helps cool concrete for World's Second Largest Hydro Plant

Growth and development in the Pacific Northwest have been so fast that electric power is badly needed. Primarily to ease the shortage, the Corps of Engineers of the U. S. Army is supervising construction of government-owned Chief Joseph Dam at Bridgeport, Washington. 51 miles downstream from Grand Coulee Dam, Chief Joseph Dam will incorporate the second largest hydro-electric power generation facilities in the world —a total rating of 1,728,000 kilowatts.

Cooling the 1,700,000 cubic yards of concrete that will be poured would be a tremendous undertaking if brine pipes were incorporated in the forms. Instead, the contractors are chilling the concrete aggregate to 40° before pouring. The dry aggregate is cooled with an air blast, the mix water is chilled, and Crystalform PakIce from Vilter PakIcers is added to the mix. Vilter VMC compressors carry their share of the refrigeration load.

Most likely you'll never be pouring enough concrete to need PakIce for the mix. But if you need ice in your plant for your product or for latent storage, chances are you can make it better and at less cost with Vilter PakIcers. If you use refrigeration and demand dependability, you can have it—and save money on operation and upkeep — with Vilter. Thousands upon thousands of plants of all kinds save money with Vilter. Probably you can, too.

Joint contractors in Chief Joseph Builders are The Arundel Corporation, L. E. Dixon Company, The Hunkin-Conkey Construction Co., and American Pipe and Construction Co. Vilter Distributor in the area is W. E. Stone & Co.

Vilter®

Your nearby Vilter Distributor or Representative will be glad to show you how you save with Vilter.

REFRIGERATION and AIR CONDITIONING

THE VILTER MANUFACTURING COMPANY
MILWAUKEE 7, WISCONSIN

Air Conditioning • Ammonia & Freon Compressors • Booster Compressors • Baudelot Coolers • Double Pipe Coolers • Blast Freezers • Evaporative & Shell & Tube Condensers • PakIcers • Pipe Coils • Valves & Fittings

WHO'S WHAT . . .

[*Continued*]

been associated with company for more than 15 years, serving as sales engineer in the New York territory.

VAN D. CLOTHIER, INC., west coast representatives for *WOLVERINE TUBE DIV.* of *CALUMET & HECLA, INC.*, has moved its northern California branch to new and larger quarters at 19 South B St., San Mateo, Calif. *JOHN A. MARSHALL* continues as manager of the northern California operation.

The Wolverine division also announced the appointment of *PHIL POWELL* as sales representative of the Southwestern district office at 2 N. York St., Houston 3, Texas. *C. T. FULLER* is manager of that office.

For *MEIER ELECTRIC & MACHINE CO.*, *DON LESLIE and CO.* of Wayne, Pa., is representing Meier in the sale of its products throughout the eastern states. *MICHAEL J. FABBRI*, former eastern sales representative of Torrington, is associated with Mr. Leslie in the new organization.

JOHN R. HAMILL has been appointed manager of the Kansas City district office of *WORTHINGTON CORP.* He succeeds *PAUL J. FOLEY*, who has been appointed general sales manager for Worthington's Plainfield, N. J. works products.

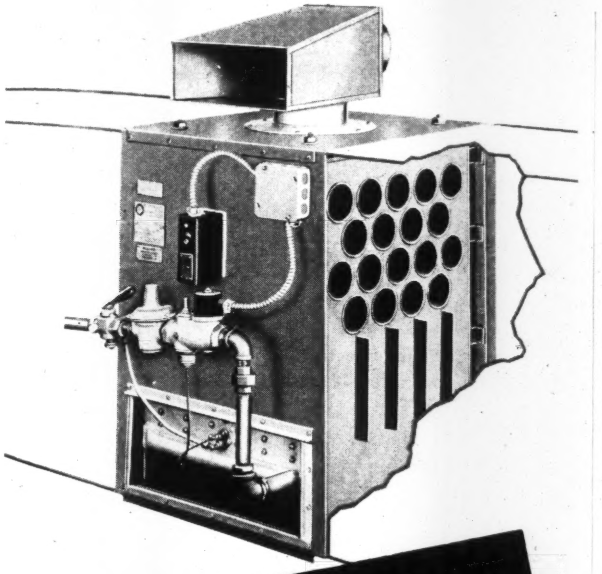
For *SERVEL, INC.*—The *FEDERAL SUPPLY CO., INC.* of Oklahoma City, is the distributor for Servel air conditioning products throughout the state of Oklahoma. Headquarters are located at 120 E. Main St. *LOUIS LOEFFLER, JR.* is president.

For *CHRYSLER AIRTEMP*—The *DAVISON DISTRIBUTING CO., INC.*, 2950 W. Davison, Detroit, has been named wholesale distributor of Airtemp air conditioning and heating products in eastern Michigan. An engineering service, covering all phases of heating and air conditioning, and a complete parts depot will be established at the Detroit office.

For *UNITED STATES RADIATOR CORP.*—*MAURICE L. CARLSON* is special representative for the Southern District with offices in Dallas. He will cover the Gulf Coast states including Florida, Alabama, Mississippi, Louisiana, Okahoma, Arkansas and Texas, plus Arizona and New Mexico.

For *TRANE CO.*–*EDWARD D. SPRANG* has been appointed to the staff of the Harrisburg, Pa., sales office. Trane also announced the new location of the Oklahoma City sales office at 819 N. Virginia St. *E. M. JAMESON* is sales engineer in charge of the office.

DRAVO CORP. has announced that its Washington office, under the supervision of *JACK T. MASON JR.*,



You Can Solve Any Duct Heating Problem with the REZNOR Duct Furnace

Reznor duct furnaces simplify the design and installation of specially engineered air-conditioning jobs. With the duct furnace as the automatic heat exchanger, you can use impelling, cooling, air cleaning and humidification equipment of the type and capacity best suited to each specific situation.

The Reznor duct furnace can be installed either singly or in multiples, in tandem or duct line spacing. It is preferred by heating engineers because it provides for air flow through the unit in either direction – permitting installation in the duct with the controls on the most accessible side. The draft diverter is of the horizontal discharge type and can be rotated a full 360°. To increase ease of inspection and service, the burner assembly is mounted in an easily removed drawer.

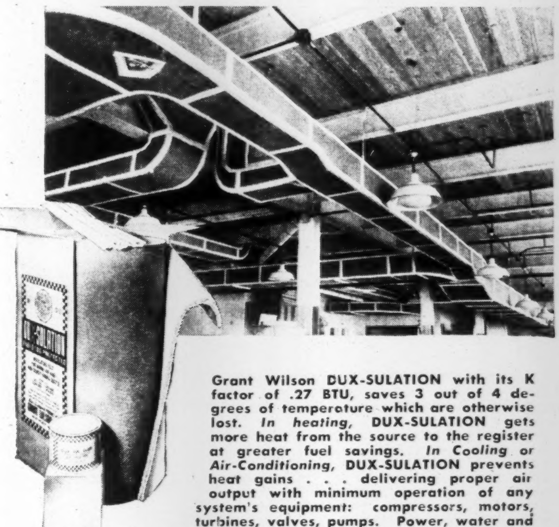
Design and construction for high temperature operation make it perfectly suited for rugged drying and curing applications. The heat exchanger is suspended in the case so that the air flow completely surrounds it. This guarantees extremely high efficiency without overheating of the case.

This versatile heater is available in 85, 100, 150 and 200 thousand BTU models. For complete details, dimensions and specifications see the Reznor Catalog in Sweet's Architectural and Industrial Construction Files or write to the Reznor Manufacturing Company, 51 Union Street, Mercer, Pa.

THE WORLD'S LARGEST-SELLING
GAS UNIT HEATER

REZNOR HEATERS

STOP Temperature Loss!



Grant Wilson DUX-SULATION with its K factor of .27 BTU, saves 3 out of 4 degrees of temperature which are otherwise lost. *In heating,* DUX-SULATION gets more heat from the source to the register at greater fuel savings. *In Cooling or Air-Conditioning,* DUX-SULATION prevents heat gains . . . delivering proper air output with minimum operation of any system's equipment: compressors, motors, turbines, valves, pumps. Power, water and repair costs are lowered . . . overload on refrigeration equipment relieved.

Other Advantages of Dux-Sulation on Duct Work: Condensation Prevention, Sound Absorption, Lower Surface Friction, Permanence, Good Appearance, Economy of Installation, Dependable Safety.

STOP Noise!

Grant Wilson Woven Asbestos FLEXI-DUCT Tape stops noise and vibrations in all duct systems by isolating them at their source. Mechanical rattles, starting and stopping screeches, shaft whine, fan hum . . . all natural attendant noises to a blower's operation . . . can be confined to the blower housing by incorporating a flexible joint made of FLEXI-DUCT tape. Installation of such a joint is simple . . . tape or bolt FLEXI-DUCT to equipment and duct work with little time and effort. Network of ducts can be easily sectionalized . . . positively precluding sound travel by conduction . . . by interspersing FLEXI-DUCT joints throughout.

USED IN *STORES • OFFICES • HOSPITALS • THEATRES • INDUSTRIES • HOMES*

Write Today for Free Sample Kit (No. 541-H)

Grant Wilson inc.
ASBESTOS and INSULATING MATERIALS
141 WEST JACKSON BLVD. • CHICAGO 4, ILLINOIS

WHO'S WHAT . . .

[Continued]

now is located at 48 Court St., Ellicott City, Md. The new mail address is P.O. Box 204.

For *VIKING AIR CONDITIONING DIV.* of the *NATIONAL RADIATOR CO.*—*W. BENJAMIN ECKENHOFF* has joined the sales staff. He will represent Viking in eastern Pennsylvania, southern New Jersey, Delaware, Maryland and Washington, D.C.

The New England office of the *POWERS REGULATOR CO.* has been moved to 295 Columbia Rd., Boston 21. The new location provides expanded facilities for sales, service and warehousing.

For *OHIO BRASS CO.*—*C. F. ADAMS CO.*, Fort Worth, Texas, is the new valve sales representative in Texas, Arkansas, Louisiana and Mississippi. Valve sales representative for Oklahoma and Kansas is *C. B. PARKHURST & CO.* of Tulsa.

For *INSUL-MASTIC CORP. of AMERICA*—*ROBERT LEAR & SON* of Louisville, Ky. is the new representative in that area.

For *STERLING, INC.*—The *JARVIS EQUIPMENT CO.*, Box 33, Station D, Cincinnati, Ohio, will represent Sterling products in southwestern and northern Ohio and the state of Kentucky. The *MURRAY-WEIDNER CO.*, P.O. Box 68, Spokane, Wash., will cover the entire state of Montana.

For *MARLOW PUMPS*—*MAURICE C. BICKERT* is a new district engineer. He will cover the four-state Mid-Atlantic district consisting of southern Pennsylvania, New Jersey, Delaware, and Maryland, from headquarters in Ridgewood, N. J.

For *LAMSON CORP.*—*HENRY P. HEJMANOWSKI* is the new Chicago regional sales manager. He will be responsible for sales and engineering in the Chicago, Kansas City, St. Louis, Dallas and Houston districts. He had been Chicago regional engineer for the past two and one-half years.

For *WESTINGHOUSE ELECTRIC CORP.*, Air Conditioning Div.—Four franchises have been awarded to new distributors. Distributors and their areas are: The *SIMONS BURNER and PETROLEUM CORP.*, Springfield, Mass.; The *AIR CONTROL CO., INC.*, Kansas City, Mo.; *B. F. KOHLI, INC.*, Lima, Ohio; and the *H. W. NORTH CO., INC.*, of Erie, Pa.

For *RADIATOR SPECIALTY CO.*—Three new district representatives and their territories are: *T. H. WILLIAMS*, St. Paul; *J. S. VOLZ*, Louisville; and *W. B. ORMSBY*, Dallas.

PENN VENTILATORS

Perform Efficiently . . . Economically!

There is a type, size and capacity for all your ventilating requirements. Efficient and economical Penn Ventilators are easily installed and last long, providing years of trouble-free, inexpensive ventilation. They have been removing dust, vapors, smoke, heat, fumes and odors from public, commercial and industrial buildings for more than a quarter of a century.

Write for descriptive literature on the entire line or send us your specific problems for qualified recommendations.

Manufacturers of:
Propeller Fan—Centrifugal Fan, Stationary, Rotary and Ridge Roof Ventilators and accessory products. Representatives and distributors in principal cities.

FOR MORE THAN 25 YEARS THE BUILDERS' ROOF TOP LINE!

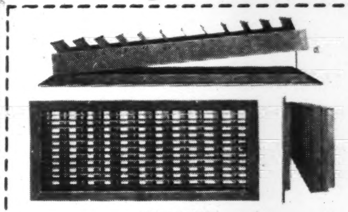
PENN VENTILATOR CO.
Main Office and Factory
North Goodman St. & Allegheny Ave.
Philadelphia 40, Pa.

when in the dark...
Look to Stewart
for Outstanding New Advances in Air Conditioning Outlets

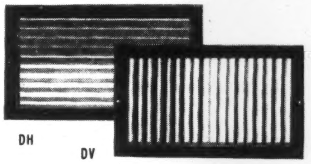
REGISTERS
GRILLES
SCOOPS
by Stewart

In this Complete Catalog . . .

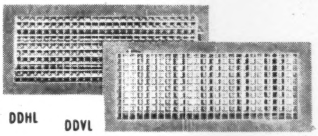
For Quality, Originality, Economy and Fast Delivery—your best choice is Stewart for Industrial and Commercial Registers — Grilles and Air Controls. You'll find one to suit your every need in the new 28 page Catalog #53.



SCOOPMASTER
Eliminates sheet metal collar—directs and controls air

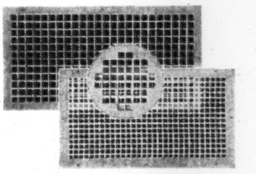


SINGLE BANK OUTLET

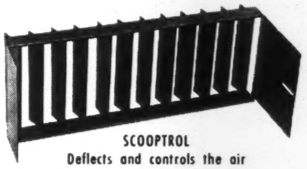


Triple Bank Registers   Individually Adjustable Fins

Opposed-Action Valves
optional with all Supply and Return Air Registers.



PLAIN LATTICE GRILLES



SCOOPTROL
Deflects and controls the air from a supply duct into a collar

Stewart MANUFACTURING CO., INC.
Grove Ave., Essex County, Cedar Grove, N. J.

2241

Representatives in the Principal Cities of United States, Canada and the West Indies.

FAST ACTING
SIMPLE TO INSTALL
EXTERNAL ADJUSTMENTS
PLUS
MERCOID®
-SEALED MERCURY CONTACT-

PROTECTION AGAINST
DUST—DIRT—CORROSION

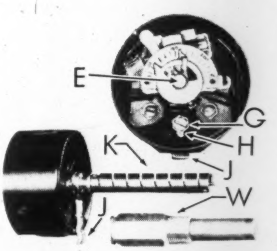
TYPE 437 IMMERSION TEMPERATURE CONTROL

MERCOID
LIMIT CONTROL

Visible operation at all times. You can always tell at a glance whether switch circuit is "on" or "off."

For horizontal mounting • Separable mounting well facilitates removal of control without draining system • Operating range is quickly set by means of external adjustment without the use of tools • Visible calibrated dial permits reading of temperature settings at a glance • 3¾" case • ¾" I.P.S. connection.

Ranges 80-240°F., 40-200°F. • Available to open or close circuit on temperature rise.



Instrument is fastened to separable well by hexagon head screw "G" and the attached clamp "J". Loosening screw "G" releases clamp "J" to drop down in slot "H" releasing instrument. "K" bimetal operating coil. "W" separable well.

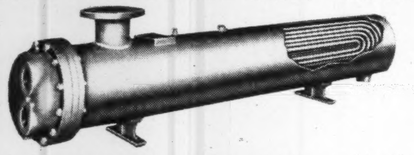
see our catalog in
ARCHITECTURAL FILE
or write for copy

WRITE FOR BULLETIN NO. 28

THE MERCOID CORPORATION, 4201 BELMONT AVE., CHICAGO, ILL.
NEW YORK: 205 E. 42nd ST. PHILADELPHIA: 3137 N. BROAD ST.

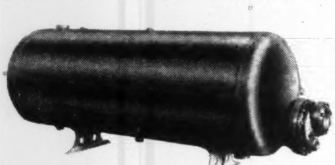
WHITLOCK
HEATING AND COOLING
Equipment

✓ INSTANTANEOUS HEATERS



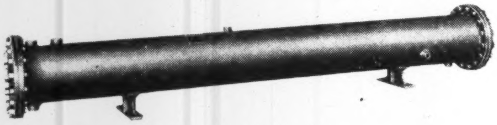
For use where hot water at a nearly uniform rate is desired. Type R shown has a removable U-tube bundle; other designs are available. Write for Bulletin 20A. Write for details on stock heaters.

✓ STORAGE HEATERS



Type K Storage heaters supply ample hot water at all times. Whitlock-Everdur construction assures lifetime service: Also made in Eterno and Standard Steel. See Bulletin 40A. Write for details on stock heaters.

✓ FUEL OIL HEATERS



Preheating promotes efficient atomization and burning. Type V-1 Heater shown is easily cleaned without breaking line connections. Whitlock heaters are made in a wide range of types and sizes. Ask for Bulletin 35.

✓ WATER CHILLERS

For Air Conditioning service Whitlock chillers are built to meet specific job requirements. The dry expansion cooler illustrated is of U-bend design; refrigerant passes through the tubes and cools water in shell — thus less refrigerant is required and danger of freeze-ups is greatly reduced. Ask for recommendations. Write for Bulletin 140.
Whitlock Engineering Service is complete — Bring your heating or cooling problems to us.

THE
WHITLOCK
MANUFACTURING
CO.

44 SOUTH STREET
HARTFORD 10, CONN.
NEW YORK · BOSTON · CHICAGO
PHILADELPHIA · DETROIT · RICHMOND
Authorized Representatives in Other Principal Cities
IN CANADA: DARLING BROTHERS, LTD., MONTREAL

NEW BOOKS & REPORTS . . .

Bending Properties of Welding Elbows

In-Plane Bending Properties of Welding Elbows presents results of strain gage investigations conducted on relatively heavy wall welding elbows having a ratio of bend radius to nominal pipe size of 1½:1. Also, several elbows having a ratio of bend radius to nominal pipe size of 1:1 were tested. A comparison is made of the results against theory. The paper was prepared by P. L. Vissat and A. J. Del Buono, engineers for Taylor Forge & Pipe Works, for presentation at the recent annual meeting of the American Society of Mechanical Engineers.

The following conclusions which apply to 180 deg and 90 deg welding elbows having a ratio of one-half of nominal size to bend radius of 1/3 or 1/2 and λ varying from 0.07 to 0.74 have been reached:

1. The previously developed theory for long radius bends (having ratios of $r/R \leq 1/10$) may be used to compute values of K with a fair degree of accuracy. An empirical expression which will give better agreement with observed values is $K = 1.40/\lambda$

2. Stress intensification factors, as previously developed for long radius bends, cannot be used with a fair degree of accuracy. Actual longitudinal stress intensification factors are somewhat larger than the theory predicts; whereas the actual transverse intensification factors are considerably lower. The experimentally derived empirical expressions for β_l, and β_t are: $\beta_l = 1.20\ \lambda^{0.67}$ and $\beta_t = 1.07/\lambda^{0.78}$

3. Longitudinal stress intensification at the middle surface may be accurately calculated by use of the following empirical expression: $\beta_{lo} = 1.12\ \lambda^{0.67}$

The nomenclature used in the conclusions is as follows:

β_l = longitudinal stress intensification factor at outer surface of pipe
β_t = transverse stress intensification factor at outer surface of pipe
β_{lo} = longitudinal stress intensification factor at middle surface of pipe
K = flexibility factor
λ = flexibility characteristic tR/r^2
r = mean pipe radius
R = radius of bend
t = average pipe wall thickness

The paper, No. 53-A-70, has been reprinted by Taylor Forge & Pipe Works, P.O. Box 485, Chicago 90.

Temperature Measurement

In *Temperature Measurement in Engineering* Volume I, authors H. Dean Baker, E. A. Ryder, and N. H. Baker provide a practical "how-to" manual on the design, performance, and operation of temperature measurement installations.

Devoted primarily to the widely-used thermocouple technique, the volume stresses specific procedures and their application to actual problems. The authors give not only the general systematic procedure as they have personally developed it, but also accurate descriptions of other published and previously unpublished methods.

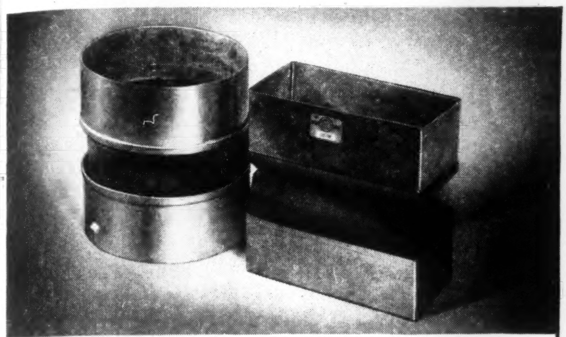
In keeping with their workable approach, Baker, Ryder, and Baker detail such information as how to compute by given formulas, how to determine a required precision for

NOW...save time and slash costs with the new

SILENT DUCT

TRADE MARK

METAL AND MATERIAL ALL IN ONE UNIT

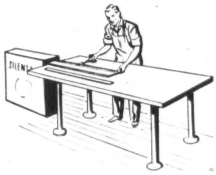


HERE'S THE FIRST really important improvement that's come to you in years . . . *Elgen Silent Duct,* the modern flexible duct connection that abolishes vibration noise in furnaces, blowers, air conditioners and attic fans. Factory-assembled into a single rugged unit, *Silent Duct* does away with the old-fashioned time-wasting need for attaching woven fabric to metal in your own shop . . . saves you up to 60% of the cost of fabricating flexible connections!

Elgen Silent Duct is delivered in 100-foot (approx.) coils in a handy dispenser and *pulls out flat,* ready to use. It is made of 24-gauge galvanized steel fastened to long-life canvas* with top resistance to fire, water and mildew . . . and it's also available with heavy, top quality, non-porous asbestos.

Order *Silent Duct* from your jobber and start saving time and money that really count . . . if necessary, ask us for your quickest source of supply. And write us for literature that tells the whole story. **Elgen Manufacturing Corp., Dept. C 41-34 39th St., Long Island City 4, New York.**

*Made under Govt. Spec. MIL-D-10860



PAT. PEND.
UNION
MADE

HOW TO FABRICATE SILENT DUCT

1. Stand dispenser against bench.
2. Pull out required amount of Silent Duct.
3. Cut with shears.
4. Bend as required.
5. Seam by any desired method.

A. F. of L.

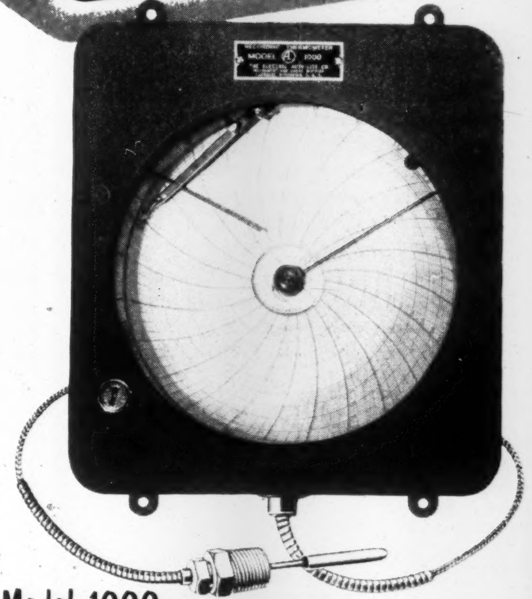
ELGEN

SILENT DUCT

SAVES MAKING YOUR OWN FLEXIBLE CONNECTIONS

For Eye-Level Readings...

AUTO-LITE



Model 1000

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NEW BOOKS & REPORTS . . .

[*Continued*]

a special measurement, and just how to perform the difficult drilling operations on which proper thermocouple installation depends. Direct means of evaluating expected magnitudes of errors and directions for avoiding them are given, while a complete chapter provides a catalog of special materials needed for a variety of situations. Other chapters cover such topics as conditions affecting temperature measurement, the thermocouple thermometer, indicating instruments, design calculation techniques, installation design types, cemented installation designs, and temperature gradient installation designs.

The Bakers are both at Columbia University where Dr. H. Dean Baker is professor of mechanical engineering and Mrs. Baker a research assistant in the same department. E. A. Ryder is a consulting engineer with Pratt and Whitney Aircraft.

Temperature Measurement in Engineering Volume I. contains 179 pages and is priced at $3.75. Publisher is John Wiley & Sons, Inc., 440 Fourth Ave., New York 16.

National Electrical Code

A new edition of the *National Electrical Code*, recently revised, has been published by the National Fire Protection Association. The 1953 American Standard replaces the 1951 edition and supplements. Following are some of the changes incorporated into the new book:

Fluorescent lighting on 277-volt circuits, used on an emergency basis during the war but never recognized in the NEC for peacetime use, is now provided for in Section 2113 of the new code. A new type of wiring material, known as mineral-insulated metal-sheathed cable, Type MI, is covered in a new Article 330. New types of nonmetallic-sheathed cable for use in moist or corrosive locations are included in Section 3362. A new type of underground feeder and branch circuit cable is covered in Article 339. A new article, 353, has been added on multi-outlet assemblies. Included for the first time is a section, Article 422, on electric space heating equipment. Sealed hermetic-type refrigeration compressor motors have been covered by specific requirements in Article 431.

Copies of the code are available from the National Fire Protection Association, 60 Batterymarch St., Boston 10, at $1.00 for a paper-bound edition and $3.00 for a slightly larger cloth-bound edition.

OTHER BOOKS & REPORTS . . .

DUST EMISSIONS FROM SMALL SPREADER-STOKER-FIRED BOILERS—a report showing how coal size and operating factors affect air pollution from several different types of steam plants. Results indicate that the quantity of fly ash and cinders discharged with the flue gas from spreader stokers increases with the amount of fine particles in the coal. It was also found that flue dust emission increases rapidly with heat-release rate and with excess combustion air.

Reprints of the report may be obtained from Bituminous Coal Research, Inc., 2609 First National Bank Bldg., Pittsburgh 22, Pa., for 25 cents each.

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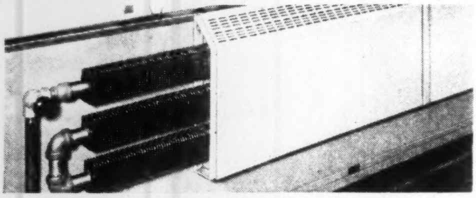

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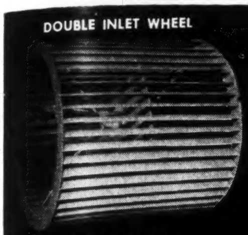

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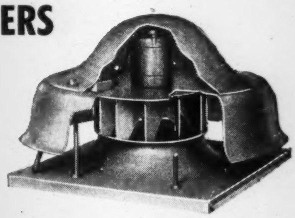

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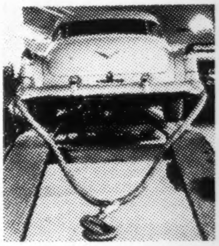

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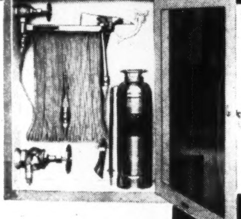

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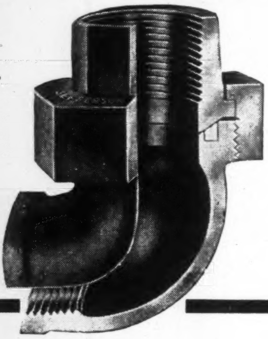

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MEETINGS & CONVENTIONS...

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, 62 Worth St., New York 13—Annual Meeting. January 24 to 27. Rice Hotel. Housto Texas. See pages 202-204 for further details.

The Society has announced that the 1954 Semi-Annu Meeting will be held June 28-30 at the New Ocean Hous Swampscott, Mass.

PLANT MAINTENANCE & ENGINEERING CON FERENCE AND SHOW—Fifth annual meeting. Januar 25 to 28, Chicago. The conference will be held at th Hotel Conrad Hilton and the show will be at the International Amphitheater. Industries to get special attentio include sheet metal, power and mechanical service equipment. The meeting will be divided into three general sessions, 16 sectional conferences and 40 round table discussions. One of the sectional conferences will dea with "Corrosion Control and Prevention."

Further information may be obtained from Clapp & Poliak, Inc., 341 Madison Ave., New York 17.

INSTRUMENT SOCIETY OF AMERICA, 921 Ridge Ave., Pittsburgh 12—Ninth Annual Regional Conference. February 4, Hotel Statler, New York. Four separate groups —Power, Process, Medical and Aviation—will present papers on "Progress in Measurement."

Further information is available from Les Butzman. The Swartwout Co., 103 Park Ave., New York.

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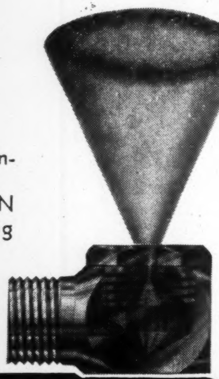

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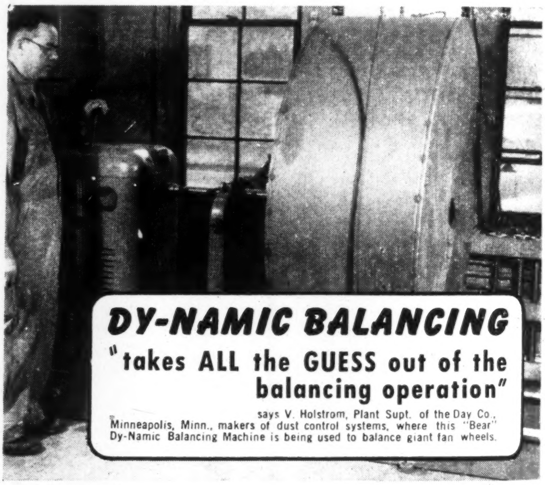

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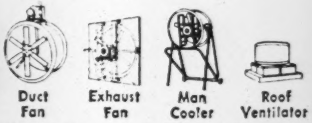
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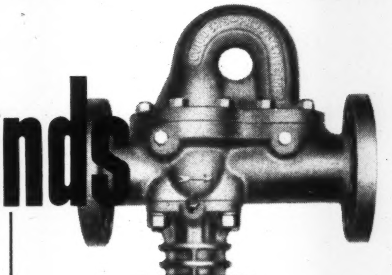

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MEETINGS & CONVENTIONS . . .

[Continued]

INDUSTRIAL VENTILATION CONFERENCE—Third annual conference, February 22-25, Kellogg Center, East Lansing, Mich. The meeting is sponsored by the Div. of Occupational Health of the Michigan Dept. of Health, and the School of Engineering of Michigan State College. Titles of talks to be presented are:

Ventilation Practices—Then and Now; Air Flow Measuring Instruments; Inside the Industrial Ventilation Manual; Engineering a High-Velocity Duct System; Sampling and Air Contaminants; Design and Application of Dust Collection Equipment; Effect of Fan Connections on Performance; A Survey of Industrial Ventilation Practices; and Comfort Ventilation and Make-up Air.

Some design problems to be discussed include fundamentals of air flow and design of balanced duct work, design of more complex exhaust systems, and the application of ventilation control to various operations in typical industrial plants.

NATIONAL ASSOCIATION OF CORROSION ENGINEERS, 1061 M & M Bldg., Houston 2—Tenth Annual Conference and Exhibition, March 15 to 19, Kansas City, Mo. Co-chairmen are F. L. Whitney, Jr., Monsanto Chemical Co., St. Louis and H. L. Bilhartz, the Atlantic Refining Co., Dallas.

AMERICAN WELDING SOCIETY, 33 W. 39th St., New York 18—1954 National Spring Technical Meeting, May 4-7, Hotel Statler, Buffalo, N.Y. The 1954 Welding and

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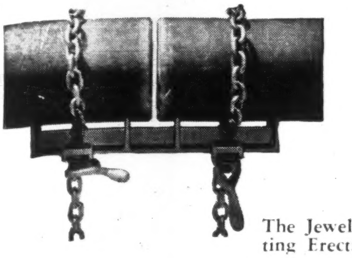

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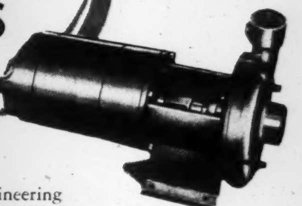

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MEETINGS & CONVENTIONS . . .

[*Continued*]

Allied Industry Exposition will be held at the Buffalo Memorial Auditorium, May 5-8.

OIL HEAT INSTITUTE OF AMERICA, INC., 500 Fifth Ave., New York 36—32nd annual convention, May 16-20, to be held concurrently with the 1954 National Indoor Comfort Exposition. Both events will be held at the Commercial Museum, Philadelphia.

HEATING, PIPING AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOC., Suite 1813, Rockefeller Plaza, New York 20—65th annual convention, May 21 28, Hotel Traymore, Atlantic City, N.J.

NATIONAL DISTRICT HEATING ASSOCIATIO 827 N. Euclid Ave., Pittsburgh 6—45th Annual Meetin May 25-28, The Greenbrier, White Sulphur Springs, W Va. John F. Collins, Jr., is secretary-treasurer of th association.

WESTERN PLANT MAINTENANCE SHOW, 75 Monadnock Bldg., San Francisco 5—West's first plan maintenance show, July 13-15, 1954, Pan Pacific Audi torium, Los Angeles. Produced by Clapp & Poliak, Inc. the show will emphasize the specialized problems of maintenance and engineering faced by western industry whic has undergone tremendous expansion since World War II.

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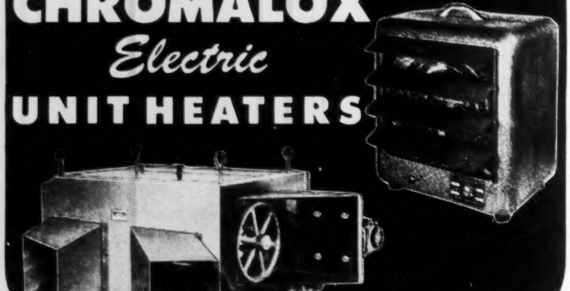

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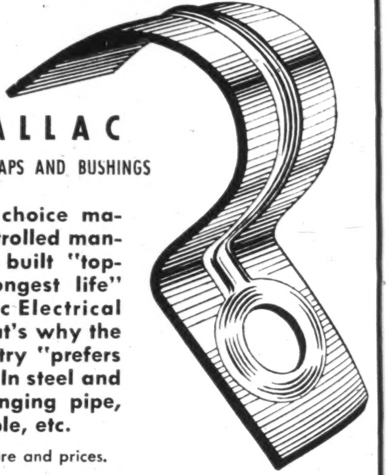

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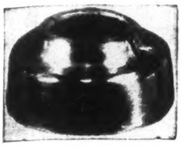

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"RITTER" CAST FLOOR & CEILING PLATES
CAST IRON & CAST BRASS

Ritter Floor & Ceiling Plates are solidly constructed, well designed, and superbly finished. Ritter plates meet City, State & Federal Specifications. We stock all sizes and styles, split or solid; in plain, Nickel or Chrome Plated finish from 1/4" to 12" pipe size. Any special sizes, heights or shapes can be furnished.

Ritter plates have been furnished for: V A Hospitals, Schools, Housing Projects, Terminals, Office Buildings and the United Nations.

Other "Ritter" Products — Tunnel Stanchions, Pipe Rolls, Flanges and other Piping Specialties.

Write For Circulars

RITTER PATTERN & CASTING CO., INC.
230 CANAL STREET, NEW YORK, N. Y.

CLASSIFIED ADVERTISING

Classified Section: Rates for classified advertising are 12 cents for each word, including heading and address. One inch $6.00. Count nine words for keyed address. Minimum $2.00 for each insertion. Cash must accompany order.

wanted . . .

Experienced Plumbing, Heating and or Air Conditioning estimator wanted. State qualifications. Brownlow's, Inc., P. O. Box 5067, Winston-Salem, North Carolina.

AIR CONDITIONING ENGINEERS — A large, well established manufacturer of heating equipment, having national distribution, is looking for engineers experienced in research and design of air conditioning equipment. Here is an opportunity for engineers having ingenuity and imagination to develop air conditioning equipment for use with all types of heating equipment. Previous administrative experience will be helpful. Address Key 1064A, Heating, Piping & Air Conditioning, 6 North Michigan Avenue, Chicago 2, Ill.

MANUFACTURERS REPRESENTATIVES WANTED — A consumed line of products with trade acceptance offers opportunity to hard working representative calling on Plumbing, Heating, Air-Conditioning Trade. If interested in a quality line, write outlining qualifications. All replies held confidential. Address Key 1075A, Heating, Piping & Air Conditioning, 6 North Michigan Avenue, Chicago 2, Ill.

MANUFACTURER'S AGENTS required by prominent manufacturer of Convector Radiators, Steam, Gas and Oil-Fired Unit Heaters. Must be well established. Territories open in several sections of United States. AIRTHERM Manufacturing Company, 700 South Spring Avenue, St. Louis 10, Missouri.

Draftsman or Engineer-Draftsman with experience in ventilation design and detailing. College degree not necessary. Salary commensurate with experience and ability. Chicago area. (Southwest Side.) Address Key 1073A, Heating, Piping & Air Conditioning, 6 North Michigan Avenue, Chicago 2, Ill.

miscellaneous . . .

OPPORTUNITY — For an Individual wanting a business of his own, or Firm wanting additional Products. Patented Steam and Temperature Control Apparatus used by Institutions, Hotels, Industries, etc. Originally begun in 1938 and put out of business by copper restrictions and draft of key personnel into war work. Patents issued; Controls proven in use by more than 30 prestige accounts. Everything needed to start again now available to right party on favorable terms. Write Alden Rogers, 109 Water St., New Haven, Conn.

Your carbide tipped CONCRETE DRILLS from 1/8" to 6" diameter PRECISION SHARPENED. For prompt, efficient service mail them to Edinger Engineering Company, R. D. No. 2, Beaver, Pennsylvania.

situations wanted . . .

SALES MANUFACTURER OR DISTRIBUTOR; Broad experience, sales and application engineering in refrigeration, air conditioning, heating, ventilation, constant temp. dust control (commercial, residential, industrial). Familiar with controls, electrical, pneumatic, 37 years old. Prefer Midwest or East area. Available January 1954. Self Reliant. Wants to increase income. Address Key 1072A, Heating, Piping & Air Conditioning, 6 North Michigan Avenue, Chicago 2, Ill.

SALES ENGINEER, age 31 with successful record and background covering ten years of design, estimating, supervision, sales engineering and administration in plumbing, heating and air conditioning trade, seeks position with progressive company. Prefer to locate in South Ontario but would consider other offers. Address Key 1074A, Heating, Piping & Air Conditioning, 6 North Michigan Avenue, Chicago 2, Ill.

HAVE YOU BOUGHT A BOND THIS MONTH?

agents wanted . . .

WANTED — Manufacturers Representative by well known New England Manufacturer of Roof Fans, Blowers, Induced Draft Fans. Available territories Chicago, Detroit, New Orleans, Richmond, Va. Address Key 1076A, Heating, Piping & Air Conditioning, 6 North Michigan Avenue, Chicago 2, Ill.

Manufacturers agents wanted in different parts of the country by leading manufacturer of portable hydraulic and mechanical pipe and tube bending equipment, for use by contractors and in industries. Our line is nationally advertised. Tal Bender, Inc., 417 North Water St., Milwaukee 2, Wisc.

for sale . . .

Large OD Alloy
STEEL PIPE
Scarce Sizes Hvy Wall

Our frequent stock lists will be of immense value to you in your search for material. A request on your letterhead places your name on our list. Your inquiries invited for pipe — any quantity, any size.

Midcontinent Tube Service, Inc.
2308 Oakton St., Evanston, Ill.

ESTIMATING TABLES OF UNIT COSTS

— for figuring pipe covering — boiler covering and duct insulation —

adapted for

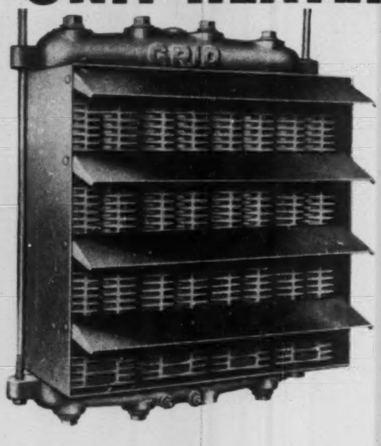
Plumbing & Heating contractors — Engineers — Estimators — Air Conditioning Firms — etc.

Special price $4.75 for complete set. Send checks to — T. P. CONSORTI, 313 E. 6th ST., N. Y. 3, N. Y.

FIRM..............................
ADDRESS..............................
CITY..............................
BY..............................

GRID
UNIT HEATERS and BLAST COILS

PUT UP TO STAY UP!



24 years of service without repairs or other maintenance . . . that's the record of GRID Unit Heaters. Only a GRID installation can provide that low cost service record. Here's why

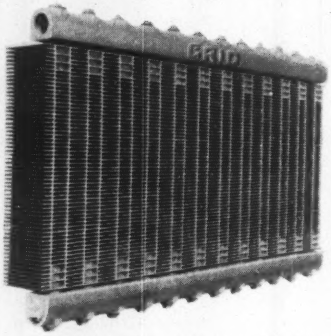
GRID is an all cast unit with finned heating sections and headers tested to withstand steam pressures up to 250# P.S.I.

GRID construction uses no brazed, soldered, rolled or welded connections between condenser and headers. A specially designed threaded nipple assures a precision, leak-proof fit.

GRID construction has all similar metals in contact with steam, thus preventing electrolytic corrosion which eventually occurs in copper type unit heaters where steam passes from iron pipes into copper cores. (Write for booklet CORROSION IN UNIT HEATERS.)

GRID construction resists corrosion from fumes present in most types of industry.

GRID design incorporating low outlet temperatures, proper fan sizes and motor speeds, assures delivery of warm comfortable air in ample volume to the working level. No stratification of warm air at the ceiling to waste your fuel dollars.

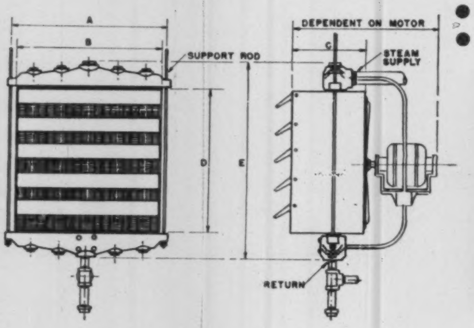


GRID Blast sections have the same high efficiency and lasting qualities as GRID Unit Heaters . . . no tortuous air passages . . . complete absence of rupture, strain and warping . . . guaranteed for steam pressures up to 250 lbs.

Hundreds of manufacturers are saving thousands of dollars in fuel and maintenance costs because theirs is a GRID installation. If it is GRID it's "Put Up To Stay Up" . . . no other unit heater has its lasting qualities.

GRID UNIT HEATERS HUNG IN 1929 ARE STILL OPERATING TODAY....

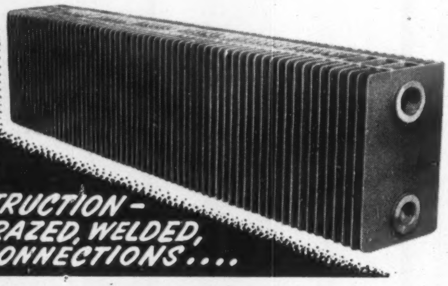
- *LARGER AIR VOLUME*
- *LOW MAINTENANCE EXPENSE*
- *MORE AIR CHANGES PER HOUR*
- *LONG LIFE*



Overall dimensions for installation of Cast Iron GRID Unit Heater

CAST IRON HEATING SECTIONS

ONE PIECE CONSTRUCTION – NO SOLDERED, BRAZED, WELDED, OR EXPANDED CONNECTIONS....



CI (CAST IRON) SERIES GRID UNIT HEATER DATA

Model No.	Dimensions A	B	C	D	E	Motor HP	RPM	Capacities 5 PSI Steam 60°F Air Vol. Fan CFM	Btu/ Hr.	Final Temp. °F	Pipe Size Supply	Return	Support Rod Dia.	Approx. Ship. Weight Lbs.
CI-1000	11⅝	10½	12¼	10 7/16	17¼	1/20	1550	572	29,080	106	1¼	1¼	½	150
CI-1200	14⅛	13⅛	12¼	13 5/16	21½	1/12	1700	798	45,450	112	1¼	1¼	½	210
CI-1500	17½	15⅜	11½	16	23⅞	⅛	1750	1500	76,500	107	1½	1½	½	280
CI-1520	17½	15⅜	11½	21	28⅜	⅛	1750	1700	101,500	114	1½	1½	½	390
CI-2000	22⅛	20 9/16	11⅞	21 1/16	28⅜	1/6	1150	2600	143,000	110	2	1½	½	490
CI-2025	22⅛	20 9/16	11⅞	25⅞	35¼	1/6	1150	2875	173,640	115	2	1½	½	520
CI-2500	27½	25⅞	13	25⅞	35¼	½	1150	4350	224,000	107	2	1½	⅝	700
CI-2504	27½	25⅞	13	25⅞	35¼	¼	1150	3300	206,000	117	2	1½	⅝	660
CI-2530	27½	25⅞	13	31	40½	½	1150	4650	275,800	114	2	1½	⅝	900
CI-3000	32⅝	31	13	31	40½	½	850	6300	332,000	108	2½	1½	⅝	1020
CI-3000	32⅝	31	13	31	40½	1½	1150	8000	380,000	103	2½	1½	⅝	1070

OFFICES IN PRINCIPAL CITIES

T.M. REG. U.S. PAT. OFF.

D. J. MURRAY MANUFACTURING CO.

WAUSAU, WISCONSIN

Write for complete catalog information on GRID Unit Heaters, GRID Blast Coils, and GRID Radiation.

SECTION OF JANUARY 1954 HEATING, PIPING & AIR CONDITIONING

1954 DIRECTORY

Heating, Piping and Air Conditioning Equipment for Industrial, Commercial, Institutional and Public Buildings

PART 1—Products Advertised In This Issue—Page 3d

For the names of the manufacturers of products advertised in this issue, look in Part 1, where the advertised products are classified in "directory style" with the noun governing. For the page on which you will find the advertising of manufacturers in this issue, see the last two pages of this yellow Directory Section.

PART 2—All Products Classified—Page 18d

If you want to know the names of one or more manufacturers making a certain product, look in Part 2, where all products are classified alphabetically in "directory style" with the noun governing (for instance, "unit heaters" are listed under "heaters, unit").

PART 3—All Trade Names—Page 123d

If you have the trade name of a product and want to know who manufactures it, look in Part 3, where trade names are alphabetically listed. Trade names the same as or identifiable from the company name are not listed. Manufacturers with such trade names can be easily identified under their product classifications in Parts 1 and 2.

PART 4—All Manufacturers' Addresses—Page 141d

For the complete name and address of any manufacturer look in Part 4.

Heating, Piping & Air Conditioning
6 N. Michigan Ave.
Chicago 2, Illinois

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6 N. Michigan Ave.,
Chicago 2, Ill.**

DIRECTORY SECTION

HEATING, PIPING, AND AIR CONDITIONING EQUIPMENT FOR INDUSTRY AND LARGE BUILDINGS

PART 1—PRODUCTS ADVERTISED IN THIS ISSUE

The products classified in this Part 1 of the Directory Section are only those actually advertised in this issue. For the complete listings of these and other products made by all manufacturers, see Part 2, starting on page 18d.

ACCUMULATORS, REFRIGERATION (FOR AIR CONDITIONING)

DOLE REFRIGERATING CO.

ALARMS, HIGH AND LOW BOILER WATER

McDONNELL & MILLER, INC.

BASES AND PADS, VIBRATION ISOLATING

BARRY CORP., THE,
KORFUND CO., INC., THE

BLADES, PROPELLER FAN

TORRINGTON MFG. CO., THE

BLOWERS, HIGH PRESSURE

BAYLEY BLOWER CO.
GENERAL BLOWER CO.
PEERLESS ELECTRIC CO., THE
WING MFG. CO., L. J.

BOILERS, HEATING, CAST IRON, SECTIONAL

SMITH CO., INC., H. B.

BOILERS, HEATING, STEEL, FIRE TUBE

FITZGIBBONS BOILER CO., INC.
KEWANEE-ROSS CORP.
SPENCER HEATER, LYCOMING DIV., AVCO MFG. CORP.

BOILERS, PACKAGED UNITS, HEATING AND PROCESS—including Controls, Feed Pump, etc.

AMES IRON WKS.
BOILER ENGINEERING AND SUPPLY CO., INC.
CLEAVER-BROOKS CO.
CYCLOTHERM DIV., UNITED STATES RADIATOR CORP.
DUTTON BOILER DIV., HAPMAN-DUTTON CO.
KEWANEE-ROSS CORP.
ORR & SEMBOWER, INC.
PREFERRED UTILITIES MFG. CORP.
SUPERIOR COMBUSTION INDUSTRIES, INC.
TITUSVILLE IRON WKS CO., THE

BURNERS, GAS, COMMERCIAL AND INDUSTRIAL

GORDON & PIATT
METTLER CO., INC., THE,
RAY OIL BURNER CO.
WEBSTER ENGINEERING CO., THE
ZINK CO., JOHN

BURNERS, GAS AND OIL COMBINED, COMMERCIAL AND INDUSTRIAL

BEST COMBUSTION EQUIPMENT CO., INC., W. N.
METTLER CO., INC., THE,
RAY OIL BURNER CO.
WEBSTER ENGINEERING CO., THE

BURNERS, OIL, COMMERCIAL AND INDUSTRIAL

BEST COMBUSTION EQUIPMENT CO., INC., W. N.
RAY OIL BURNER CO.

CEMENT AND COMPOUNDS, PIPE JOINT

KEY CO.

For the page on which you will find the advertising of manufacturers in this issue, see the Index to Advertisers on the last two pages of this yellow Directory Section

CHASERS, THREADING DIE

RIDGE TOOL CO., THE

CHILLERS, WATER, FOR AIR CONDITIONING AND REFRIGERATION

ACME INDUSTRIES, INC.
ALSTROM CORP., THE
KENNARD CORP.
SERVEL, INC.
TACO HEATERS, INC.
WHITLOCK MFG. CO., THE
YULA WATER HEATERS, INC

CIRCULATORS FOR HOT WATER HEATING SYSTEMS

BELL & GOSSETT CO.
DUNHAM CO., C. A.
FOSTORIA PRESSED STEEL CORP., THE
HOFFMAN SPECIALTY MFG. CORP.
TRANE CO., THE

CLAMPS, PIPE, WELDING

JEWEL MFG. CO

COILS AND PANELS, RADIANT HEATING AND COOLING, PREFABRICATED

KRITZER RADIANT COILS, INC.

COILS, FOR HOT WATER STORAGE TANKS

GENERAL FITTINGS CO

COILS, PIPE

REMPE CO

COMPRESSORS, AIR

GARDNER-DENVER CO

COMPRESSORS, REFRIGERATING, CENTRIFUGAL

TRANE CO., THE

COMPRESSORS, REFRIGERATING, COMBINED WITH CONDENSER, WATER CHILLER, PIPING CONNECTIONS, AND CONTROLS

ACME INDUSTRIES, INC
CARRIER CORP.
TRANE CO., THE

COMPRESSORS, REFRIGERATING, RECIPROCATING

BRUNNER MFG. CO.
COPELAND REFRIGERATION CORP.
CURTIS REFRIGERATING MACHINE DIV., CURTIS MFG CO.
FRICK CO.
TRANE CO., THE
VILTER MFG. CO., THE
WORTHINGTON CORP.

CONCRETE, INSULATING, FOR UNDERGROUND PIPING

ZONOLITE CO., "Z" CRETE DIV.,

CONDENSERS, REFRIGERATING, AIR COOLED

KRAMER TRENTON CO

CONDENSERS, REFRIGERATING, EVAPORATIVE

BALTIMORE AIRCOIL CO., INC.
BUSH MFG. CO.
CARRIER CORP.
CURTIS REFRIGERATING MACHINE DIV., CURTIS MFG CO.
KENNARD CORP.
TRANE CO., THE
UNITED STATES AIR CONDITIONING CORP.

CONDENSERS, REFRIGERATING, SHELL AND TUBE

ACME INDUSTRIES, INC

CONDUIT, UNDERGROUND PIPING

DURANT INSULATED PIPE CO.
DURANT INTERNATIONAL CORP.
PORTER & CO., INC., H. W.

CONNECTIONS, DUCT, FLEXIBLE (ASBESTOS, CANVAS, ETC.)

ELGEN MFG. CORP.
GRANT WILSON, INC

CONTROLLERS AND STARTERS, MOTOR

ALLEN-BRADLEY CO.
ALLIS-CHALMERS MFG. CO.
WARD LEONARD ELECTRIC CO.

For the page on which you will find the advertising of manufacturers in this issue, see the Index to Advertisers on the last two pages of this yellow Directory Section

CONTROLS, DRAFT, BAROMETRIC

COLE-SEWELL ENGINEERING CO

CONTROLS, FLAME FAILURE

COMBUSTION CONTROL CORP

CONVERTORS, STEAM

ALSTROM CORP., THE,
GENERAL FITTINGS CO.
MANNING & LEWIS ENGINEERING CO
YULA WATER HEATERS, INC.

COOLERS, UNIT (FLOOR TYPE)

BUSH MFG. CO.

COOLERS, UNIT (SUSPENDED TYPE)

BUSH MFG. CO

COUPLINGS, FLEXIBLE, POWER TRANSMISSION

WALDRON CORP., JOHN.

CUT-OFFS, LOW WATER, HEATING BOILER

McDONNELL & MILLER, INC

DAMPERS, DUCT, MANUALLY OPERATED

TITUS MFG. CORP.
WATERLOO REGISTER CO., INC

DEHUMIDIFIERS, ABSORPTION AND ADSORPTION

NIAGARA BLOWER CO.
SURFACE COMBUSTION CORP

DEHUMIDIFIERS, SPRAYED COIL

AIR & REFRIGERATION CORP
KENNARD CORP.

DEHYDRATORS, REFRIGERANT

HENRY VALVE CO

DIFFUSERS, AIR

AIR DEVICES, INC.
BARBER-COLMAN CO.
CARNES CO., W. R.
CONNOR ENGRG. CORP.
MULTI-VENT DIV., THE PYLE-NATIONAL CO.
TITUS MFG. CORP.
UNIVERSAL DIFFUSER CORP.

DIFFUSERS, AIR, CEILING, WITH COMBINED LIGHTING FIXTURE

CARNES CO., W. R

DIFFUSERS, AIR, HIGH PRESSURE

BARBER-COLMAN CO.
CONNOR ENGRG. CORP.
UNIVERSAL DIFFUSER CORP

DRIVES, V BELT

ALLIS-CHALMERS MFG. CO.

DUCTS AND DUCT FITTINGS, PRE-FABRICATED, NON-METALLIC

FLEXIBLE TUBING CORP

EJECTORS, SEWAGE

YEOMANS BROS. CO

ELBOWS, BALANCING, FOR HOT WATER HEATING SYSTEMS

DUNHAM CO., C. A

ELIMINATORS, AIR, FOR HEATING AND PIPING SYSTEMS

DOLE VALVE CO., THE
DUNHAM CO., C. A.
GORTON HEATING CORP
MAID-O'-MIST, INC.
SARCO CO., INC.

EQUIPMENT, BALANCING

BEAR MFG. CO.

EXCHANGERS, HEAT

BUSH MFG. CO.
MANNING & LEWIS ENGINEERING CO.
TRANE CO., THE

For the page on which you will find the advertising of manufacturers in this issue, see the Index to Advertisers on the last two pages of this yellow Directory Section

EXHAUSTERS, WELDING FUME

AMMERMAN CO., C. L.

FANS, AXIAL FLOW, PRESSURE TYPE

DEBOTHEZAT FANS DIV., AMERICAN MACHINE & METALS, INC.
JOY MFG. CO.
SOUTH BEND AIR PRODUCTS, INC.
WING MFG. CO., L. J.

FANS, CENTRIFUGAL

AMERICAN BLOWER CORP.
BAYLEY BLOWER CO.
BISHOP & BABCOCK MFG. CO., THE
BUFFALO FORGE CO.
CLARAGE FAN CO.
GENERAL BLOWER CO.
PEERLESS ELECTRIC CO., THE
TRANE CO., THE
UTILITY FAN CORP.

FANS, PROPELLER

BISHOP & BABCOCK MFG. CO., THE
GENERAL BLOWER CO.
ILG ELECTRIC VENTILATING CO.
PEERLESS ELECTRIC CO., THE,
SOUTH BEND AIR PRODUCTS, INC.
WING MFG. CO., L. J.

FASTENERS, INSULATION

MIRACLE ADHESIVES CORP.

FEEDERS, WATER, HEATING BOILER

McDONNELL & MILLER, INC.

FILTERS, AIR, AUTOMATIC

AMERICAN AIR FILTER CO., INC.
CONTINENTAL AIR FILTERS INC.

FILTERS, AIR, UNIT, CLEANABLE

CONTINENTAL AIR FILTERS INC.
FARR CO.

FILTERS, AIR, UNIT, RENEWABLE MEDIA

CONTINENTAL AIR FILTERS, INC.

FILTERS, AIR, UNIT, THROW-AWAY

GLASFLOSS

FITTINGS, EXHAUST, GARAGE, FOR ATTACHING CAR EXHAUST PIPE

AMMERMAN CO., C. L.

FITTINGS, HOT WATER HEATING SYSTEMS, ONE PIPE

DUNHAM CO., C. A.

FITTINGS, PIPE, STEEL, SOCKET WELD

WATSON-STILLMAN FITTINGS DIV., H. K. PORTER CO., INC.

FITTINGS, PIPE, STEEL, WELDING

MIDWEST PIPING CO., INC.
TUBE TURNS, INC.

FITTINGS, PIPE, STEEL, WELDING, SEAMLESS

GLOBE STEEL TUBES CO.

FLANGES, PIPE, STEEL, FORGED

TAYLOR FORGE & PIPE WKS.

FLANGES, PIPE, STEEL, WELDING

MIDWEST PIPING CO., INC.
TAYLOR FORGE & PIPE WKS.
TUBE TURNS, INC.

FURNACES, WARM AIR, FOR INDUSTRIAL AND LARGE BUILDING CENTRAL HEATING

CAMPBELL HEATING CO.
HAYES FURNACE MFG. & SUPPLY CO.
WATERMAN-WATERBURY CO., THE

GAGES, LIQUID LEVEL

HENRY VALVE CO.
LIQUIDEPTH INDICATORS, INC.

GAGES, OIL TANK

LIQUIDEPTH INDICATORS, INC.

GOVERNORS, PUMP

McDONNELL & MILLER, INC.

For the page on which you will find the advertising of manufacturers in this issue, see the Index to Advertisers on the last two pages of this yellow Directory Section

GRILLES

A-J MFG. CO.
BARBER-COLMAN CO.
DIAMOND MFG. CO.
HENDRICK MFG. CO.
REGISTER & GRILLE MFG. CO., INC.
STEWART MFG. CO., INC.
TITUS MFG. CORP.
WATERLOO REGISTER CO., INC.

HANGERS AND SUPPORTS, PIPE

MINERALLAC ELECTRIC CO.
UNISTRUT PRODUCTS CO.

HEADS, SAFETY

BLACK, SIVALLS & BRYSON, INC.

HEATERS, AIR, DIRECT FIRED, COAL

CAMPBELL HEATING CO.
NATIONAL HEATER CO., INC.
OLSON & CO., ARTHUR A.

HEATERS, AIR, DIRECT FIRED, COMBINATION GAS AND OIL

AIRTHERM MFG. CO.
DRAVO CORP.
OLSON & CO., ARTHUR A.

HEATERS, AIR, DIRECT FIRED, GAS, CENTRIFUGAL FAN TYPE

AIRTHERM MFG. CO.
CAMPBELL HEATING CO.
DRAVO CORP.
HAYES FURNACE MFG. & SUPPLY CO.
NATIONAL HEATER CO., INC.
OLSON & CO., ARTHUR A.

HEATERS, AIR, DIRECT FIRED, OIL, FLOOR TYPE

AIRTHERM MFG. CO.
CAMPBELL HEATING CO.
DRAVO CORP.
NATIONAL HEATER CO., INC.
OLSON & CO., ARTHUR A.

HEATERS, AIR, DIRECT FIRED, OIL, SUSPENDED TYPE

NATIONAL HEATER CO., INC.

HEATERS, DUCT, GAS

HAYES FURNACE MFG. & SUPPLY CO.
REZNOR MFG. CO.

HEATERS, INDIRECT, SUBMERGED

GENERAL FITTINGS CO.

HEATERS, UNIT, ELECTRIC HEATING ELEMENT

WIEGAND CO., EDWIN L.

HEATERS, UNIT, GAS, PROPELLER FAN TYPE

AIRTHERM MFG. CO.
CARRIER CORP.
DRAVO CORP.
MODINE MFG. CO.
NESBITT, INC., JOHN J.
WEBSTER & CO., WARREN
WESTINGHOUSE ELECTRIC CORP., STURTEVANT DIV.
WING MFG. CO., L. J.
YOUNG RADIATOR CO.
ZINK CO., JOHN

HEATERS, UNIT, STEAM AND HOT WATER, CABINET TYPE

NESBITT, INC., JOHN J.
YOUNG RADIATOR CO.

HEATERS, UNIT, STEAM AND HOT WATER, CENTRIFUGAL FAN TYPE

AIRTHERM MFG. CO.
BISHOP & BABCOCK MFG. CO., THE
McQUAY, INC.
NESBITT, INC., JOHN J.
TRANE CO., THE

HEATERS, UNIT, STEAM AND HOT WATER, PROPELLER FAN TYPE, HORIZONTAL BLOW

AIRTHERM MFG. CO.
CARRIER CORP.
McCORD CORP.
McQUAY, INC.
MODINE MFG. CO.
MURRAY MFG. CO., D. J.
NESBITT, INC., JOHN J.
TRANE CO., THE
WESTINGHOUSE ELECTRIC CORP., STURTEVANT DIV.
YOUNG RADIATOR CO.

HEATERS, UNIT, STEAM AND HOT WATER, PROPELLER FAN TYPE, VERTICAL BLOW

AIRTHERM MFG. CO.
CARRIER CORP.

For the page on which you will find the advertising of manufacturers in this issue, see the Index to Advertisers on the last two pages of this yellow Directory Section

McCORD CORP.
McQUAY, INC.
MODINE MFG. CO.
NESBITT, INC., JOHN J.
TRANE CO., THE
WESTINGHOUSE ELECTRIC CORP., STURTEVANT DIV.
WING MFG. CO., L. J.
YOUNG RADIATOR CO.

HEATERS, WATER, STEAM, INSTANTANEOUS

ALSTROM CORP., THE,
GENERAL FITTINGS CO.
MANNING & LEWIS ENGINEERING CO
WHITLOCK MFG. CO., THE,
YULA WATER HEATERS, INC

HEATERS, WATER, STEAM, STORAGE

WHITLOCK MFG. CO., THE.

HOSE, NON-METAL, AND FITTINGS

FLEXIBLE TUBING CORP.

HUMIDIFIERS, DIRECT, SPRAY HEAD

BAHNSON CO

HUMIDIFIERS, UNIT, ROOM TYPE (without heating)

BAHNSON CO.

HUMIDISTATS

MINNEAPOLIS-HONEYWELL REGULATOR CO

INSERTS, CONCRETE

UNISTRUT PRODUCTS CO

INSULATION, BOILER AND TANK

KEASBEY & MATTISON CO.
MUNDET CORK CORP.

INSULATION, BUILDING

INFRA INSULATION, INC.

INSULATION, DUCT, SOUND DEADENING (FOR APPLICATION INSIDE DUCT)

GLASS FIBERS, INC.
GUSTIN-BACON MFG. CO

INSULATION, DUCT, THERMAL

GLASS FIBERS, INC.
GRANT WILSON INC.
GUSTIN-BACON MFG. CO.
PITTSBURGH PLATE GLASS CO

INSULATION, PIPE

AMERICAN GILSONITE CO.
DURANT INSULATED PIPE CO.
DURANT INTERNATIONAL CORP.
GLASS FIBERS, INC.
MUNDET CORK CORP.
PORTER & CO., INC., H. W.
ZONOLITE CO., "Z" CRETE DIV.

JOINTS, PIPE, EXPANSION, PACKLESS

AMERICAN DISTRICT STEAM CO., INC.
FLEXONICS CORP.

JOINTS, PIPE, EXPANSION, SLIP

AMERICAN DISTRICT STEAM CO., INC
YARNALL-WARING CO.

LOUVERS AND SHUTTERS, AUTOMATICALLY OR MANUALLY CONTROLLED

SWARTWOUT CO., THE

LOUVERS, SUN REFLECTING

KAWNEER CO

MACHINES, REFRIGERATION, ABSORPTION

SERVEL, INC

MACHINES, TUBE FINNING

UNITED MACHINERY SALES CO.

For the page on which you will find the advertising of manufacturers in this issue, see the Index to Advertisers on the last two pages of this yellow Directory Section

MANIFOLDS AND HEADERS, PREFABRICATED, FOR HEATING SYSTEMS

DUNHAM CO., C. A.

MARKERS, PIPE, HOLE AND SADDLE

JEWEL MFG. CO.

METERS, AIR VELOCITY, DIRECT READING

ILLINOIS TESTING LABORATORIES, INC.

METERS, FLOW, STEAM

BUILDERS-PROVIDENCE, INC.

MOTORS, ELECTRIC, FRACTIONAL HP

BALDOR ELECTRIC CO.
CENTURY ELECTRIC CO.
GENERAL ELECTRIC CO.
WAGNER ELECTRIC CORP.

MOTORS, ELECTRIC, 1 HP AND OVER

ALLIS-CHALMERS MFG. CO.
BALDOR ELECTRIC CO.
CENTURY ELECTRIC CO.
GENERAL ELECTRIC CO.
WAGNER ELECTRIC CORP.

NOZZLES, ATOMIZING

MONARCH MFG. WKS., INC.

NOZZLES, OIL BURNER

MONARCH MFG. WKS., INC.

NOZZLES, SPRAY

DELAVAN MFG. CO.
MONARCH MFG. WKS., INC.
SPRAYING SYSTEMS CO.

OPERATORS, DAMPER, DUCT

TAYLOR INSTRUMENT COS.

OPERATORS, VALVE

TAYLOR INSTRUMENT COS.

PANELS, PERFORATED, FOR AIR DIFFUSION

MULTI-VENT DIV., THE PYLE-NATIONAL CO.

PARTS FOR HEATING AND AIR CONDITIONING EQUIPMENT

ATLAS MFG. CO. (boiler jackets)
DURO-DYNE CORP. (hardware and parts used in fabricating dampers and turning vanes)
PHOENIX PRODUCTS CO., METAL SPINNING DIV. (metal spinnings for fan housings, diffusers, etc.)

PIPE, BRASS AND COPPER

HUSSEY & CO., C. G.

PIPE, CAST IRON, PRESSURE, BELL AND SPIGOT

DURIRON CO., INC., THE (acid resisting)

PIPE, PRE-INSULATED

DURANT INSULATED PIPE CO.
DURANT INTERNATIONAL CORP.

PIPE, STEEL, ALLOY

YOUNGSTOWN SHEET AND TUBE CO., THE

PIPE, STEEL, BUTT AND LAP WELDED

NATIONAL TUBE DIV., UNITED STATES STEEL CORP.
SPANG-CHALFANT, DIV. OF NATIONAL SUPPLY CO.
WHEATLAND TUBE CO.
YOUNGSTOWN SHEET AND TUBE CO., THE.

PIPE, STEEL, STAINLESS

REPUBLIC STEEL CORP., STEEL & TUBES DIV.

PLATES, FLOOR AND CEILING

RITTER PATTERN & CASTING CO., INC.

PREHEATERS, FUEL OIL

ALSTROM CORP., THE
DAVIS ENGINEERING CORP.
GENERAL FITTINGS CO.
REMPE CO.
WHITLOCK MFG. CO., THE
YULA WATER HEATERS, INC.

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PSYCHROMETERS, SLING AND HAND ASPIRATED

TAYLOR INSTRUMENT COS.

PULLEYS AND SHEAVES, FOR BELT DRIVES

DODGE MFG. CORP.

PUMPS, BOILER FEED

CHICAGO PUMP CO.
PEERLESS PUMP DIV., FOOD MACHINERY & CHEMICAL CORP.
SKIDMORE CORP.

PUMPS, CENTRIFUGAL

ALLIS-CHALMERS MFG. CO.
AURORA PUMP CO.
BELL & GOSSETT CO.
BUFFALO PUMPS, INC.
CARVER PUMP CO.
FOSTORIA PRESSED STEEL CORP., THE
GARDNER-DENVER CO.
GOULDS PUMPS, INC.
INGERSOLL-RAND CO.
JACUZZI BROS., INC.
PEERLESS PUMP DIV., FOOD MACHINERY & CHEMICAL CORP.
TRANE CO., THE
YEOMANS BROS. CO.

PUMPS, CONDENSATION RETURN

CHICAGO PUMP CO.
EAGAN CO., INC., WALTER H.
GOULDS PUMPS, INC.
SKIDMORE CORP.
STERLING, INC.
TRANE CO., THE
WEIL PUMP CO.

PUMPS, DEEP WELL, TURBINE

PEERLESS PUMP DIV., FOOD MACHINERY & CHEMICAL CORP.

PUMPS, PROPELLER

PEERLESS PUMP DIV., FOOD MACHINERY & CHEMICAL CORP.

PUMPS, RECIPROCATING

GARDNER-DENVER CO.

PUMPS, SEWAGE AND SLUDGE

AMERICAN-MARSH PUMPS, INC.
YEOMANS BROS. CO.

PUMPS, SUMP

AMERICAN-MARSH PUMPS, INC.
SKIDMORE CORP.
YEOMANS BROS. CO.

PUMPS, VACUUM HEATING

CHICAGO PUMP CO.
NASH ENGINEERING CO.
SKIDMORE CORP.

PUMPS, VISCOUS LIQUIDS AND HEAVY MATERIALS

YEOMANS BROS. CO.

RADIATION, BASEBOARD, FERROUS

KRITZER RADIANT COILS, INC.
TRANE CO., THE

RADIATION, BASEBOARD, NON-FERROUS

BROWN PRODUCTS CO.
BUSH MFG. CO.
KRITZER RADIANT COILS, INC.
NESBITT, INC., JOHN J.
RADIANT-RAY RADIATION, INC.
TRANE CO., THE

RADIATION, CONVECTION TYPE, FERROUS

MURRAY MFG. CO., D. J.
STEDCO PRODUCTS
VULCAN RADIATOR CO., THE,

RADIATION, CONVECTION TYPE, NON-FERROUS

AIRTHERM MFG. CO.
BUSH MFG. CO.
NESBITT, INC., JOHN J.
TRANE CO., THE
VULCAN RADIATOR CO., THE
YOUNG RADIATOR CO.

RADIATION, FIN TUBE TYPE

AUTORAD, INC.
BROWN PRODUCTS CO.
BUSH MFG. CO.
KRITZER RADIANT COILS, INC.
NESBITT, INC., JOHN J.
RADIANT-RAY RADIATION, INC.
STEDCO PRODUCTS
TRANE CO., THE
VULCAN RADIATOR CO., THE,

RECORDER-CONTROLLERS, HUMIDITY

TAYLOR INSTRUMENT COS.

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RECORDER-CONTROLLERS, TEMPERATURE

TAYLOR INSTRUMENT COS.

RECORDERS, HUMIDITY

TAYLOR INSTRUMENT COS.

RECORDERS, TEMPERATURE

ELECTRIC AUTO-LITE CO., INSTRUMENT AND GAUGE DIV.

REDUCERS, SPEED

GENERAL ELECTRIC CO.

REGISTERS

A-J MFG. CO.
DOLE VALVE CO., THE
INDEPENDENT REGISTER CO., THE
REGISTER & GRILLE MFG. CO., INC.
STANDARD STAMPING AND PERFORATING CO.
STEWART MFG. CO., INC.
TITUS MFG. CORP.
WATERLOO REGISTER CO., INC.

REGULATORS, DAMPER SETS

DURO-DYNE CORP.

REGULATORS, DRAFT, COMBUSTION

CLEVELAND FUEL EQUIPMENT CO.

REGULATORS, LEVEL, LIQUID

ALCO VALVE CO.
McDONNELL & MILLER, INC.

REGULATORS, PRESSURE, LIQUID

FISHER GOVERNOR CO.
McDONNELL & MILLER, INC.

REGULATORS, TEMPERATURE

DETROIT CONTROLS CORP.
FULTON SYLPHON DIV., ROBERTSHAW-FULTON CONTROLS CO.
HOFFMAN SPECIALTY MFG. CORP.
JOHNSON SERVICE CO.
MERCOID CORP., THE
SARCO CO., INC.
TAYLOR INSTRUMENT COS.

RELAYS, ELECTRICAL

ALLEN-BRADLEY CO.
WARD LEONARD ELECTRIC CO.

RINGS, WELDING

ROBVON INDUSTRIES, INC.

SCOOPS, AIR, FOR DEFLECTING FLOW IN DUCTS

STEWART MFG. CO., INC.
TITUS MFG. CORP.
WATERLOO REGISTER CO., INC.

SCREENS, SUN REFLECTING

INGERSOLL PRODUCTS DIV., BORG-WARNER CORP.

SEPARATORS, AIR

DUNHAM CO., C. A.

SEPARATORS, OIL

ACME INDUSTRIES, INC.

SETS, PIPE BIT, FOR BORING HOLES IN WOOD FOR PIPE AND TUBING

GREENLEE TOOL CO.

SHEETS, COPPER

HUSSEY & CO., C. G.

SHEETS, STEEL, GALVANIZED

UNITED STATES STEEL CORP.

SOLDER (SILVER), BRAZING ALLOYS, AND FLUXES

HANDY & HARMAN

STOCKS AND DIES

RIDGE TOOL CO., THE

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STOKERS, INDUSTRIAL AND COMMERCIAL

BITUMINOUS COAL INSTITUTE
DETROIT STOKER CO.

STRAINERS, PIPE LINE

ALCO VALVE CO.
ARMSTRONG MACHINE WKS.
HENRY VALVE CO.
SARCO CO., INC.
ZURN MFG. CO., J. A.

SURFACE, FINNED, COOLING, BRINE

BUSH MFG. CO.
G & O MFG. CO., THE,
REMPE CO.
TRANE CO., THE
YOUNG RADIATOR CO.

SURFACE, FINNED, COOLING, COLD WATER

BAYLEY BLOWER CO.
BUSH MFG. CO.
DRAYER-HANSON, INC.
G & O MFG. CO., THE,
KENNARD CORP.
McQUAY, INC.
NESBITT, INC., JOHN J.
REMPE CO.
TRANE CO., THE
YOUNG RADIATOR CO.

SURFACE, FINNED, COOLING, DIRECT EXPANSION

BAYLEY BLOWER CO.
BUSH MFG. CO.
DRAYER-HANSON, INC.
G & O MFG. CO., THE,
KENNARD CORP.
McQUAY, INC.
REMPE CO.
TRANE CO., THE
YOUNG RADIATOR CO.

SURFACE, FINNED, HEATING AND COOLING, PRE-ASSEMBLED, INCLUDING COILS, ELIMINATOR PLATES, SETTLING TANK, AND CASING

CLARAGE FAN CO.

SURFACE, FINNED, HEATING, INDIRECT, FERROUS

BAYLEY BLOWER CO.
BUSH MFG. CO.
DRAYER-HANSON, INC.
MURRAY MFG. CO., D. J.
REMPE CO.
TRANE CO., THE

SURFACE, FINNED, HEATING, INDIRECT, NON-FERROUS

BAYLEY BLOWER CO.
BUSH MFG. CO.
DRAYER-HANSON, INC.
G & O MFG. CO., THE,
KENNARD CORP.
McQUAY, INC.
NESBITT, INC., JOHN J.
TRANE CO., THE
UNITED STATES AIR CONDITIONING CORP.
YOUNG RADIATOR CO.

SWITCHES, ELECTRICAL

WARD LEONARD ELECTRIC CO.

SWITCHES, FLOAT, REFRIGERATION

ALCO VALVE CO.

SWITCHES, FLOW

McDONNELL & MILLER, INC.

SWITCHES, LIQUID LEVEL

ALCO VALVE CO.
McDONNELL & MILLER, INC.

SYSTEMS, COMBUSTION CONTROL

CLEVELAND FUEL EQUIPMENT CO.
PERFEX CORP.
WING MFG. CO., L. J.

SYSTEMS, FIRE EXTINGUISHING, AND HEAT AND SMOKE DETECTORS

ALLEN MFG. CO., W. D.

TANKS, EXPANSION, FOR HOT WATER HEATING SYSTEMS

THRUSH & CO., H. A. (tank drain)

TANKS, PROCESS AND STORAGE

GENERAL FITTINGS CO.

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THERMOMETERS, INDICATING, INDUSTRIAL

UNITED STATES GAUGE, DIV OF AMERICAN MACHINE AND METALS, INC

THERMOMETERS, INDICATING, REMOTE-READING

ELECTRIC AUTO-LITE CO., INSTRUMENT AND GAUGE DIV.
POWERS REGULATOR CO., THE
SARCO CO., INC.

THERMOSTATS, DUCT TYPE

MINNEAPOLIS-HONEYWELL REGULATOR CO.

THERMOSTATS, IMMERSION

MERCOID CORP., THE

THERMOSTATS, ROOM OR WALL

JOHNSON SERVICE CO.
MINNEAPOLIS-HONEYWELL REGULATOR CO
POWERS REGULATOR CO., THE

THERMOSTATS, WEATHER COMPENSATING

DETROIT CONTROLS CORP.
SARCOTHERM CONTROLS, INC

TOWERS, COOLING, MECHANICAL DRAFT

BALTIMORE AIRCOIL CO., INC.
BINKS MFG. CO.
BUSH MFG. CO.
CURTIS REFRIGERATING MACHINE DIV., CURTIS MFG CO.
HALSTEAD & MITCHELL
KENNARD CORP.
LILIE-HOFFMANN COOLING TOWERS, INC
MARLEY CO., THE,
MARLO COIL CO.
PHILLIPS COOLING TOWER CO., INC.
PRITCHARD & CO., J. F.

TRANSMITTERS, PRESSURE AND TEMPERATURE

TAYLOR INSTRUMENT COS

TRAPS, STEAM, FLOAT-THERMOSTATIC

MARSH HEATING EQUIPMENT CO.
SARCO CO., INC.

TRAPS, STEAM, MECHANICAL

ANDERSON CO., V. D., THE
ARMSTRONG MACHINE WKS
SARCO CO., INC

TRAPS, STEAM, THERMOSTATIC

NICHOLSON & CO., W. H
SARCO CO., INC.
TRANE CO., THE

TUBES, BOILER

BABCOCK & WILCOX CO., THE, TUBULAR PRODUCTS DIV

TUBING, BRASS AND COPPER

AMERICAN BRASS CO., THE
CHASE BRASS & COPPER CO
HUSSEY & CO., C. G.
READING TUBE CORP.
REVERE COPPER AND BRASS, INC.

TUBING, FINNED

AUTORAD, INC.
WOLVERINE TUBE DIV., CALUMET AND HECLA, INC.

TUBING, STEEL, STAINLESS

REPUBLIC STEEL CORP., STEEL & TUBES DIV

TURBINES, MECHANICAL DRIVE

WING MFG. CO., L. J

UNIONS, MALLEABLE, BRASS SEAT

FAIRBANKS CO., THE
GRINNELL CO., INC.
JEFFERSON UNION CO

UNITS, AIR CONDITIONING, CENTRAL STATION TYPE

AIR & REFRIGERATION CORP.
AIRTEMP DIV., CHRYSLER CORP

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BISHOP & BABCOCK MFG. CO., THE
CARRIER CORP.
CLARAGE FAN CO.
CURTIS REFRIGERATING MACHINE DIV., CURTIS MFG. CO.
GOVERNAIR CORP.
KENNARD CORP.
McQUAY, INC.
MUELLER CLIMATROL, INC.
NIAGARA BLOWER CO.
TRANE CO., THE
TYPHOON AIR CONDITIONING CO., INC.
UNITED STATES AIR CONDITIONING CORP.
YOUNG RADIATOR CO.

UNITS, AIR CONDITIONING, HORIZONTAL PACKAGE TYPE

AIR & REFRIGERATION CORP.
BUSH MFG. CO.
CARRIER CORP.
CLARAGE FAN CO.
KENNARD CORP.
McQUAY, INC.
TRANE CO., THE
YOUNG RADIATOR CO.

UNITS, AIR CONDITIONING, INDUSTRIAL TYPE

AIR & REFRIGERATION CORP.
BISHOP & BABCOCK MFG. CO., THE
BUSH MFG. CO.
CARRIER CORP.
CLARAGE FAN CO.
KENNARD CORP.
McQUAY, INC.
NIAGARA BLOWER CO.
SURFACE COMBUSTION CORP.
TRANE CO., THE
YOUNG RADIATOR CO.

UNITS, AIR CONDITIONING, SUMMER, ROOM TYPE, FLOOR CABINET, REMOTE COMPRESSOR OR COLD WATER, UNDER 3 TONS CAPACITY

McQUAY, INC.
TRANE CO., THE

UNITS, AIR CONDITIONING, SUMMER, STORE TYPE, FLOOR CABINET, SELF CONTAINED COMPRESSOR, 3 HP AND OVER

AIRTEMP DIV., CHRYSLER CORP.
BRUNNER MFG. CO.
CARRIER CORP.
CURTIS REFRIGERATING MACHINE DIV., CURTIS MFG. CO.
FRICK CO.
TRANE CO., THE
TYPHOON AIR CONDITIONING CO., INC.

UNITS, AIR CONDITIONING, WINDOW TYPE

CURTIS REFRIGERATING MACHINE DIV., CURTIS MFG. CO.

UNITS, AIR CONDITIONING, WINTER, ROOM TYPE, FLOOR CABINET

McQUAY, INC.
TRANE CO., THE

UNITS, AIR CONDITIONING, YEAR AROUND, ROOM TYPE, FLOOR CABINET

AMERICAN RADIATOR & STANDARD SANITARY CORP.
CARRIER CORP.
McQUAY, INC.
TRANE CO., THE

UNITS, HEAT RECOVERY, AIR-TO-AIR

THERM-O-WHEEL, INC.

VALVES, ANGLE

OHIO INJECTOR CO., THE
WALWORTH CO.

VALVES, BACK PRESSURE

KLIPFEL VALVES, INC.

VALVES, BALANCING, FOR FORCED HOT WATER HEATING SYSTEMS

OHIO BRASS CO.

VALVES, BLOW-OFF

EVERLASTING VALVE CO.

VALVES, BUTTERFLY

ROCKWELL CO., W. S.

VALVES, BYPASS, WITH PROVISIONS FOR SOME CIRCULATION WHEN CLOSED

OHIO BRASS CO.

VALVES, CHECK

HENRY VALVE CO.
OHIO INJECTOR CO., THE

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VALVES, DIAPHRAGM

FISHER GOVERNOR CO.

VALVES, DIAPHRAGM, PACKLESS

CRANE CO.

VALVES, FIRE PROTECTION, SPRINKLER SYSTEM CONTROL

EVERLASTING VALVE CO.

VALVES, FLOAT

ALCO VALVE CO.
KECKLEY CO., O. C.
MAID-O'-MIST, INC.
McDONNELL & MILLER, INC.

VALVES, FLOW CONTROL, FOR HOT WATER HEATING SYSTEMS

DUNHAM CO., C. A.

VALVES, FORGED STEEL

OHIO INJECTOR CO., THE

VALVES, GATE, ALLOY

OHIO INJECTOR CO., THE

VALVES, GATE, BRASS AND BRONZE

EVERLASTING VALVE CO.
OHIO INJECTOR CO., THE

VALVES, GATE, IRON BODY

EVERLASTING VALVE CO.
OHIO INJECTOR CO., THE

VALVES, GATE, STEEL

EVERLASTING VALVE CO.
OHIO INJECTOR CO., THE

VALVES, GLOBE, ALLOY

OHIO INJECTOR CO., THE

VALVES, GLOBE, BRASS AND BRONZE

FAIRBANKS CO., THE
OHIO INJECTOR CO., THE
WALWORTH CO.

VALVES, GLOBE, IRON BODY

OHIO INJECTOR CO., THE

VALVES, GLOBE, STEEL

OHIO INJECTOR CO., THE

VALVES, MIXING, HOT AND COLD WATER

DOLE VALVE CO., THE
SARCO CO., INC.
SARCOTHERM CONTROLS, INC.
YULA WATER HEATERS, INC.

VALVES, MIXING, STEAM AND WATER

JOHNSON SERVICE CO.
SARCO CO., INC.
SARCOTHERM CONTROLS, INC.

VALVES, PLUG

OHIO INJECTOR CO., THE

VALVES, PRESSURE REDUCING AND REGULATING, AIR AND GAS

CASH CO., A. W.
WATTS REGULATOR CO.

VALVES, PRESSURE REDUCING AND REGULATING, HOT WATER

CASH CO., A. W.
DUNHAM CO., C. A.
WATTS REGULATOR CO.

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VALVES, PRESSURE REDUCING AND REGULATING, STEAM

ATLAS VALVE CO
CASH CO., A. W.
FISHER GOVERNOR CO
WATTS REGULATOR CO

VALVES, RADIATOR, AIR

DOLE VALVE CO., THE
GORTON HEATING CORP
MAID-O'-MIST, INC.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, SELF-CONTAINED

SARCO CO., INC
STERLING, INC

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, SELF-CONTAINED, PACKLESS

SARCO CO., INC

VALVES, RADIATOR, ORIFICE

SARCO CO., INC

VALVES, RADIATOR, STEAM AND HOT WATER, HAND

SARCO CO., INC
TRANE CO., THE

VALVES, RADIATOR, STEAM AND HOT WATER, MODULATING

SARCO CO., INC

VALVES, REFRIGERATION (ANGLE, CHECK, GATE, GLOBE, NEEDLE, RELIEF)

HENRY VALVE CO

VALVES, REFRIGERATION, EXPANSION, THERMOSTATIC

ALCO VALVE CO

VALVES, REFRIGERATION, FLOAT, HIGH PRESSURE

ALCO VALVE CO

VALVES, REFRIGERATION, MAGNETIC STOP

ALCO VALVE CO

VALVES, RELIEF, HOT WATER, COMBINED PRESSURE AND TEMPERATURE OPERATED

McDONNELL & MILLER, INC.

VALVES, RELIEF, HOT WATER, PRESSURE OPERATED

DUNHAM CO., C. A.
McDONNELL & MILLER, INC.

VALVES, RELIEF, HOT WATER, PRESSURE OPERATED, SELF-FILLING

McDONNELL & MILLER, INC.

VALVES, SLIDE

ROCKWELL CO., W. S.

VALVES, SOLENOID

ALCO VALVE CO.
AUTOMATIC SWITCH CO
SPORLAN VALVE CO.

VALVES, STEAM-JACKETED

EVERLASTING VALVE CO.

VALVES, 2, 3 AND 4 WAY

AUTOMATIC SWITCH CO

VANES, DUCT TURNING, PREFABRICATED

DURO-DYNE CORP
TITUS MFG. CORP.

VENTILATORS, UNIT

NESBITT, INC., JOHN J.
TRANE CO., THE

VENTILATORS, ROOF, FAN

ALADDIN HEATING CORP
AMMERMAN CO., C. L.
BISHOP & BABCOCK MFG. CO., THE
COOK CO., LOREN
GALLAHER CO., THE
GENERAL BLOWER CO
MUCKLE MFG. CO.
PENN VENTILATOR CO
SWARTWOUT CO., THE
TRANE CO., THE

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VENTILATORS, ROOF, GRAVITY

AMMERMAN CO., C. L.
PENN VENTILATOR CO.
SWARTWOUT CO., THE

VENTILATORS, UNIT

TRANE CO., THE

WASHERS, AIR

AIR & REFRIGERATION CORP.
BAYLEY BLOWER CO.
CLARAGE FAN CO.

WHEELS, BLOWER

BARRY BLOWER CO.
CLARAGE FAN CO.
TORRINGTON MFG. CO., THE.

WIRING, COMPLETE ASSEMBLIES, CUSTOM-MADE

CORNISH WIRE CO., INC.

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DIRECTORY SECTION
HEATING, PIPING, AND AIR CONDITIONING EQUIPMENT FOR INDUSTRY AND LARGE BUILDINGS
PART 2—ALL PRODUCTS CLASSIFIED

ABSORBERS, SHOCK, LIQUID, TO ELIMINATE WATER HAMMER IN PIPING

Finn & Co., Inc., T. R., New York, N. Y.
Packless Metal Hose, Inc., New Rochelle, N. Y.
Smith Co., S. Morgan, York, Pa.
Wade Mfg. Co., Elgin, Ill.

ABSORBERS, VIBRATION

See Hose, Metal and Fittings; Bases and Pads, Vibration Isolating

ABSORBERS, VIBRATION, FOR REFRIGERANT LINES

American Metal Hose Branch, The American Brass Co., Waterbury, Conn.
Atlantic Metal Hose Co., Inc., New York, N. Y.
Finn & Co., New York, N. Y.
Firestone Industrial Products, Akron, O.
Flexonics Corp., Maywood, Ill.
Johnson Metal Hose, Inc., Waterbury, Conn.
Packless Metal Hose, Inc., New Rochelle, N. Y.
Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.
Pleasantaire Corp., Washington, D. C.
Resitoflex Corp., Belleville, N. J.
Seamlex Co., Inc., Long Island City, N. Y.
Techniflex Corp., Port Jervis, N. Y.
Titeflex, Inc., Newark, N. J.
United Metal Hose Co., Inc., Long Island City, N. Y.
Wade Mfg. Co., Elgin, Ill.

ABSORPTION DEHUMIDIFIERS

See Dehumidifiers, Absorption and Adsorption

ABSORPTION REFRIGERATION MACHINES

See Machines, Refrigeration, Absorption

ACCESS DOORS AND PANELS

See Doors and Panels, Access

ACCUMULATORS, REFRIGERATION (FOR AIR CONDITIONING)

Acme Industries, Inc., Jackson, Mich.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Dole Refrigerating Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Kenmore Machine Products, Inc., Lyon, N. Y.
McQuay, Inc., Minneapolis, Minn.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Phillips & Co., H. A., Chicago, Ill.
Reco Products Div., Recony Corp., New York, N. Y.
Remco, Inc., Zelienople, Pa.
Roessing Mfg. Co., Pittsburgh, Pa.
Techniflex Corp., Port Jervis, N. Y.
Temprite Products Corp., Birmingham, Mich.
Vilter Mfg. Co., The, Milwaukee, Wis.
Wabash Mfg. Co., Chicago, Ill.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
XL Refrigerating Co., Chicago, Ill.

ADHESIVES, FOR PIPE COVERING

Arabol Mfg. Co., New York, N. Y.
Armstrong Cork Co., Lancaster, Pa.
Devices, Inc., New York, N. Y.
Flintkote Co., The, New York, N. Y.
Foster Co., Benjamin, Philadelphia, Pa.
Fuller Co. of Calif., H. B., San Francisco, Calif.
Grant Wilson, Inc., Chicago, Ill.
Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Minnesota Mining & Mfg. Co., Adhesives & Coatings Div., Detroit, Mich.
Miracle Adhesives Corp., New York, N. Y.
Moore Inc., Goodloe E., Danville, Ill.
Mystik Adhesive Products, Div. of Chicago Show Printing Co., Chicago, Ill.
National Cork Co., Englewood, N. J.
Pecora Paint Co., Inc., Philadelphia, Pa.
Presstite Engineering Co., St. Louis, Mo.
Ruberoid Co., New York, N. Y.
Sauereisen Cements Co., Pittsburgh, Pa.
Spring Packing Corp., Chicago, Ill.
Standard Asbestos Mfg. Co., Chicago, Ill.
Stic-Klip Mfg. Co., Inc., Cambridge, Mass.
Swift & Co., Chicago, Ill.
Vimasco Corp., Charleston, W. Va.
Western Mineral Products Co., Minneapolis, Minn.

ADSORBERS, ODOR

Aerotrol Engineering Co., Pittsburgh, Pa.
Carbide and Carbon Chemicals Div., Union Carbide & Carbon Corp., New York, N. Y.
Connor Engineering Corp., Danbury, Conn.
Elgin-Refinite, Div. of Elgin Softener Corp., Elgin, Ill.
Pur Air Div., Barnebey-Cheney Co., Columbus, O.
Research Products Corp., Madison, Wis.
Reynolds Electric Co., River Grove, Ill.
Tamms Industries, Inc., Chicago, Ill.

ADSORPTION DEHUMIDIFIERS

See Dehumidifiers, Absorption and Adsorption

AFTERCOOLERS, COMPRESSED AIR

Adams Co., Inc., R. P., Buffalo, N. Y.
Air Conversion Research Corp., Chicago, Ill.
Alstrom Corp., Bronx, N. Y.
American Locomotive Co., Alco Products Div., New York, N. Y.
American Moistening Co., Providence, R. I.
Andale Co., Philadelphia, Pa.
Armstrong Co., Richard M., Westchester, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Brown Fintube Co., The, Elyria, O.
Bury Compressor Co., Erie, Pa.
Centrifix Corp., Cleveland, O.
Chicago Pneumatic Tool Co., New York, N. Y.
Condenser Service & Engineering Co. Inc., Hoboken, N. J.
Davis Engineering Corp., Elizabeth, N. J.
Downington Iron Works, Downington, Pa.
Doyle and Roth Mfg. Co., Inc., Brooklyn, N. Y.
Electric Sprayit Co., The, Sheboygan, Wis.
Graham Mfg. Co., Inc., New York, N. Y.
Griscom-Russell Co., The, Massillon, O.
Halstead & Mitchell, Pittsburgh, Pa.
Heatron, Inc., York, Pa.
Heat-X-Changer Co., Inc., Brewster, N. Y.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Ingersoll-Rand Co., New York, N. Y.
Johnson Corp., The, Three Rivers, Mich.
Joy Mfg. Co., Pittsburgh, Pa.
Kewanee-Ross Corp., Kewanee, Ill.
Manning & Lewis Engineering Co., Newark, N. J.
Modine Mfg. Co., Racine, Wis.
Niagara Blower Co., New York, N. Y.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Rome-Turney Radiator Co., Rome, N. Y.
Schramm, Inc., West Chester, Pa.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Wilson Engineering Corp., Chicago, Ill.
Worthington Pump & Machinery Corp., Harrison, N. J.
Young Radiator Co., Racine, Wis.
Yula Water Heaters, Inc., New York, N. Y.

AIR AFTERCOOLERS

See Aftercoolers, Compressed Air

AIR BREAK FITTINGS

See Fittings, Draining, Fixed Air Break

AIR CLEANERS

See Cleaners, Air, Electrical

AIR COMPRESSORS

See Compressors, Air

AIR CONDITIONERS

See Units, Air Conditioning

AIR CONDITIONING UNITS

See Units, Air Conditioning

AIR DIFFUSERS

See Diffusers, Air Ceiling; Grilles; Panels, Perforated, for Air Diffusion; Registers

AIR ELIMINATORS

See Eliminators, Air

AIR FILTER CLEANING COMPOUNDS

See Compounds, Cleaning, Air Filter

AIR FILTER GAGES

See Gages, Air Filter

AIR FILTERS

See Filters, Air

AIR FRESHENING

See Compounds, Air Freshening; Adsorbers, Odor

AIR OPERATING VALVES

See Valves, Air Operating

AIR PURIFICATION

See Adsorbers, Odor; Compounds, Air Freshening

AIR RECOVERY EQUIPMENT

See Adsorbers, Odor

AIR SEPARATORS

See Separators, Air

AIR-TANKLESS WATER HEATERS

See Heaters, Water, Air-Tankless

AIR VALVES

See Valves, Radiators, Air

AIR VELOCITY METERS

See Meters, Air Velocity, Direct Reading; Anemometers

AIR VENTS

See Eliminators, Air

AIR VOLUME METERS

See Meters, Volume, Air and Gas

AIR WASHERS

See Washers, Air

ALARMS, COMBUSTIBLE GAS

Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Davis Instruments, Div. of Davis Emergency Equipment Co., Inc., Newark, N. J.
Johnson-Williams Ltd., Palo Alto, Calif.
Mine Safety Appliances Co., Pittsburgh, Pa.
Taller & Cooper, Inc., Brooklyn, N. Y.

ALARMS, HIGH AND LOW BOILER WATER

American District Telegraph Co., New York, N. Y.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Benjamin Electric Mfg. Co., Des Plaines, Ill.
Campbell Co., J. A., Long Beach, Calif.
Copes-Vulcan Div., Continental Foundry & Machine Co., Erie, Pa.
Coral Designs, Div. of Henry G. Dietz Co., Long Island City, N. Y.
Defender Instrument & Regulator Co., St. Louis, Mo.
Diamond Power Specialty Corp., Lancaster, O.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fischer & Porter Co., Hatboro, Pa.
Johnson Corp., The, Three Rivers, Mich.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Magnetrol, Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Milton Roy Co., Philadelphia, Pa.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Newark Controls Co., Bloomfield, N. J.
Preferred Utilities Mfg. Corp., New York, N. Y.
Reliance Gauge Column Co., Cleveland, O.
Scaico, Inc., Palmyra, N. J.
Schaub Engineering Co., Fred H., Chicago, Ill.
Unit Alarm Co., The, Schenectady, N. Y.
Wright-Austin Co., Detroit, Mich.
Yarnall-Waring Co., Philadelphia, Pa.

ALARMS, LIQUID LEVEL, AUDIBLE

American District Telegraph Co., New York, N. Y.
Automatic Control Co., St. Paul, Minn.
B/W Controller Corp., Birmingham, Mich.
Benjamin Electric Mfg. Co., Des Plaines, Ill.
Boston Auto Gage Co., Pittsfield, Mass.
Bristol Co., The, Waterbury, Conn.
Clark Controller Co., Cleveland, O.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument & Regulator Co., St. Louis, Mo.
Fielden Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Magnetrol, Inc., Chicago, Ill.
Maid-O'-Mist, Inc., Chicago, Ill.
Milton Roy Co., Philadelphia, Pa.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Newark Controls Co., Bloomfield, N. J.
Reliance Gauge Column Co., Cleveland, O.
Ripley Co., Inc., Middletown, Conn.
Rochester Mfg. Co., Inc., Rochester, N. Y.
Scaico, Inc., Palmyra, N. J.
Scully Signal Co., Cambridge, Mass.
Uehling Instrument Co., Paterson, N. J.
Unit Alarm Co., The, Schenectady, N. Y.
Wright-Austin Co., Detroit, Mich.

ALARMS, LIQUID LEVEL, VISUAL

Automatic Control Co., St. Paul, Minn.
Bristol Co., The, Waterbury, Conn.
Cooper Co., Clark, Palmyra, N. J.
Fielden Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Fischer & Porter Co., Hatboro, Pa.
Magnetrol, Inc., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Scaico, Inc., Palmyra, N. J.
Uehling Instrument Co., Paterson, N. J.

ALARMS, SMOKE

American District Telegraph Co., New York, N. Y.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Cleveland Fuel Equipment Co., Cleveland, Ohio
Combustion Control Corp., Boston, Mass.
Defender Instrument & Regulator Co., St. Louis, Mo.
De-Tec-Tronic Laboratories, Inc., Chicago, Ill.
Edwards, L. V., Rockville Center, N. Y.
Ess Instrument Co., Bergenfield, N. J.
General Power Plant Corp., Ossining, N. Y.
McNeill Engineering Co., Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Ripley Co., Inc., Middletown, Conn.
Sterns-Flinn Corp., New York, N. Y.
Unit Alarm Co., The, Schenectady, N. Y.
Worner Electronic Devices, Rankin, Ill.

ALGAE AND SLIME CONTROL, WATER TREATMENT FOR

See Treatment, Water, for Slime and Algae Control

ALUMINUM COATED SHEETS

See Sheets, Aluminum Coated

ALUMINUM PIPE

See Pipe, Aluminum

ALUMINUM SHEETS

See Sheets, Aluminum

ANALYZERS, CARBON DIOXIDE, PORTABLE

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Barclay, Inc., Robert, Chicago, Ill.
Daigger & Co., A., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
Engelhard, Inc., Chas., Newark, N. J.
General Power Plant Corp., Ossining, N. Y.
Hays Corp., Michigan City, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Permutit Co., New York, N. Y.
Preferred Utilities Mfg. Corp., New York, N. Y.
Service to Industry, West Hartford, Conn.
Uehling Instrument Co., Paterson, N. J.
Victory Engineering Corp., Union, N. J.
Will Corp., Rochester, N. Y.

ANCHORS FOR INSULATION

See Fasteners, Insulation

ANEMOMETERS

Barclay, Inc., Robert, Chicago, Ill.
Beckman & Whitley, Inc., San Carlos, Calif.
Daigger & Co., A., Chicago, Ill.
Dietzgen Co., Eugene, Chicago, Ill.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.

G. M. Mfg. Co., New York, N. Y.
General Scientific Equipment Co., Philadelphia, Pa.
Hill, E. Vernon & Co., Lake Geneva, Wis.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Mine Safety Appliances Co., Pittsburgh, Pa.
Taylor Instrument Companies, Rochester, N. Y.
Wallace & Tiernan Co., Inc., Newark, N. J.

ANGLE VALVES

See Valves, Angle

ANGLES, BARS, BEAMS, CHANNELS AND TEES (LIGHT WEIGHT SHAPES)

Allegheny Ludlum Steel Corp., Pittsburgh, Pa. (Stainless)
Aluminum Co. of America, Pittsburgh, Pa.
American Brass Co., Waterbury, Conn.
Atlantic Steel Co., Atlanta, Ga.
Bethlehem Steel Co., Bethlehem, Pa.
Byers Co., A. M., Pittsburgh, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Columbia-Geneva Steel Div., United States Steel Corp., San Francisco, Calif.
Decatur Iron & Steel Co., Decatur, Ala.
Dow Chemical Co., The, Midland, Mich.
Inland Steel Co., Chicago, Ill.
Inland Steel Products Co., Milwaukee, Wis.
International Steel Co., Evansville, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Kling Bros. Engineering Wks., Chicago, Ill
Laclede Steel Co., St. Louis, Mo.
Lees, John, Div., The, Serrick Corp., Muncie, Ind
Mesker Steel Corp., Geo. L., Evansville, Ind.
Republic Steel Corp., Cleveland, O.
Revere Copper and Brass, Incorporated, New York, N. Y.
Reynolds Metals Co., Louisville, Ky.
Tennessee Coal & Iron Div., United States Steel Corp., Fairfield Ala.
Truscon Steel Div., Republic Steel Corp., Youngstown, O.
United States Steel Corp., Pittsburgh, Pa.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

ANODES FOR CORROSION PROTECTION

See Devices, Electrolytic, for Preventing Corrosion

ANTI-FREEZE COMPOUNDS FOR SNOW MELTING

See Compounds, Anti-Freeze

AQUASTATS

See Thermostats

ARC WELDERS

See Welders, Arc

ARC WELDING ELECTRODES

See Electrodes, Arc Welding

ASBESTOS FIBER AND CEMENT PIPE

See Pipe, Asbestos Fiber and Cement

ASBESTOS PACKING

See Packing, Asbestos

ASH CONVEYORS

See Conveyors, Coal and Ash

ASSEMBLIES, MANIFOLD, FOR METERS

Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.

ATOMIZING NOZZLES

See Nozzles, Atomizing

AXIAL FLOW FANS

See Fans, Axial Flow, Pressure Type

BACKING RINGS

See Rings, Welding

BALANCING ELBOWS FOR HOT WATER HEATING SYSTEMS

See Elbows, Balancing, for Hot Water Heating Systems

BALANCING EQUIPMENT

See Equipment, Balancing

BALANCING VALVES

See Valves, Balancing

BALL BEARINGS

See Bearings, Ball

BAROMETRIC CONTROLS

See Controls, Draft, Barometric

BASEBOARD RADIATION

See Radiation, Baseboard

BASES, MOTOR, TENSION ADJUSTING

Ackermann Mfg. Co., Wheeling, W. Va.
Alexander Bros., Philadelphia, Pa.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Elliott Co., Crocker-Wheeler Div., Ampere, N. J.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Rhoads & Sons, J. E., Philadelphia, Pa.
Valley Foundry & Machine Works, Inc., Fresno, Calif.

BASES AND PADS, VIBRATION ISOLATING

Barry Corp., Watertown, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Celotex Corp., The, Chicago, Ill.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Clarage Fan Co., Kalamazoo, Mich.
Cork Insulation Co., Inc., New York, N. Y.
Fabreeka Products Co., Inc., Boston, Mass.
Felters Company, The, Boston, Mass.
Finn & Co., New York, N. Y.
Firestone Industrial Products, Akron, O.
Glass Fibers, Inc., Toledo, O.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Hobsite Products Co., Harrison, N. J.
Johns-Manville, New York, N. Y.
Korfund Co., Inc., Long Island City, N. Y.
Lord Mfg. Co., Erie, Pa.
M B Mfg. Co., Inc., The, New Haven, Conn.
Mundet Cork Corp., North Bergen, N. J.
National Cork Co., Englewood, N. J.
National Lead Co., New York, N. Y.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Raybestos-Manhattan, Inc., Passaic, N. J.
Robinson Aviation, Inc., Teterboro, N. J.
Sponge Rubber Products Co., The, Shelton, Conn.
Spring Packing Corp., Chicago, Ill.
United Cork Companies, Kearny, N. J.
United States Rubber Co., New York, N. Y.
Vibration Eliminator Co., Long Island City, N. Y.
Western Felt Works, Chicago, Ill.

BEARINGS, BALL

Ahlberg Bearing Co., Chicago, Ill.
Bearings Co. of America, Lancaster, Pa.
Dodge Mfg. Corp., Mishawaka, Ind.
Fafnir Bearing Co., The, New Britain, Conn.
Landis & Gyr Inc., New York, N. Y.
Link-Belt Co., Chicago, Ill.
Marlin-Rockwell Corp., Jamestown, N. Y.
New Departure Div., General Motors Corp., Bristol, Conn.
Nice Ball Bearing Co., Philadelphia, Pa.
Norma-Hoffman Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Philadelphia, Pa.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Thomson Industries, Inc., Manhasset, N. Y.
Torrington Co., The, Bantam Bearings Div., South Bend, Ind.
Wood's Sons Co., T. B., Chambersburg, Pa.

BEARINGS, NEEDLE

Roller Bearing Co. of America, West Trenton, N. J.
Torrington Co., The, Bantam Bearings Div., South Bend, Ind.

BEARINGS, PILLOW BLOCK

Ahlberg Bearing Co., Chicago, Ill.
Anti-Friction Bearings Co., Los Angeles, Calif.
Caldwell Co., W. E., Louisville, Ky.
Central Die Casting & Mfg. Co., Inc., Chicago, Ill.
Chain Belt Co., Milwaukee, Wis.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Clizbe Bros., Mfg. Co., Plymouth, Ind.
Dick Co., Inc., R. & J., Passaic, N. J.
Dodge Mfg. Corp., Mishawaka, Ind.
Fafnir Bearing Co., The, New Britain, Conn.
Freed Products Co., Moline, Ill.
Goldens' Foundry & Machine Co., Columbus, Ga.
Jeffrey Mfg. Co., Columbus, O.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Lau Blower Co., Dayton, O.
Link-Belt Co., Chicago, Ill.
Medart Co., St. Louis, Mo.
Moraine Products Div., General Motors Corp., Dayton, O.
Randall Graphite Bearings, Inc., Lima, O.
Royersford Foundry & Machine Co., Inc., Royersford, Pa.
SKF Industries, Inc., Philadelphia, Pa.
Shafer Bearing, Div. of Chain Belt Co., Downers Grove, Ill.
Sprout, Waldron & Co., Muncy, Pa.
Standard Pressed Steel Co., Jenkintown, Pa.

Stephens-Adamson Mfg. Co., Aurora, Ill.
Triangle Mfg. Co., Oshkosh, Wis.
Whiteley Bearing Corp., Chicago, Ill.
Wood's Sons Co., T. B., Chambersburg, Pa.

BEARINGS, ROLLER

Chain Belt Co., Milwaukee, Wis.
Dodge Mfg. Corp., Mishawaka, Ind.
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
Link-Belt Co., Chicago, Ill.
Marlin-Rockwell Corp., Jamestown, N. Y.
Medart Co., St. Louis, Mo.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Roller Bearing Co. of America, West Trenton, N. J.
Royersford Foundry & Machine Co, Inc., Royersford, Pa.
SKF Industries, Inc., Philadelphia, Pa.
Shafer Bearing, Div. of Chain Belt Co., Downers Grove, Ill. (self aligning)
Timken Roller Bearing Co., Canton, O.
Torrington Co., The, Bantam Bearings Div., South Bend, Ind.
Wood's Sons Co., T. B., Chambersburg, Pa.

BEARINGS, SLEEVE

Bronze Bearings, Inc., Cranford, N. J.
Chemalloy Associates, Santee, Calif.
Cleveland Graphite Bronze Co., Cleveland, O.
Dodge Mfg. Corp., Mishawaka, Ind.
Federal-Mogul Corp., Detroit, Mich.
Gatke Corp., Chicago, Ill.
Green Fuel Economizer Co., Beacon, N. Y.
International Powder Metallurgy, Inc., Ridgway, Pa.
Johnson Bronze Co., New Castle, Pa.
Keystone Carbon Co., Inc., St. Marys, Pa.
Lau Blower Co., Dayton, O.
Medart Co., St. Louis, Mo.
Moraine Products Div., General Motors Corp., Dayton, O.
Morganite, Inc., Carbon Specialties Div., Long Island City, N. Y.
Randall Graphite Bearings, Inc., Lima, O.
Thomson Industries, Inc., Manhasset, N. Y.
Whiteley Bearing Corp., Chicago, Ill.
Wood's Sons Co., T. B., Chambersburg, Pa.

BELLOWS, THERMOSTATIC AND METALLIC

Bishop & Babcock Mfg. Co., Cleveland, O.
Bridgeport Thermostat Div., Robertshaw-Fulton Controls Co., Bridgeport, Conn.
Clifford Mfg. Co., of Standard-Thomson Corp., Waltham, Mass.
Cook Electric Co., Chicago, Ill.
Flexonics Corp., Maywood, Ill.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Solar Aircraft Co., San Diego, Calif.
Zallea Bros., Wilmington, Del.

BELTING, FLAT, LEATHER

Alexander Bros., Philadelphia, Pa.
Allen Mfg. Co., W. D., Chicago, Ill.
Baldwin Belting, Inc., New York, N. Y.
Chicago Belting Co., Chicago, Ill.
Graton & Knight Co., Worcester, Mass.
Houghton & Co., E. F., Philadelphia, Pa.
Rhoads & Sons, J. E., Philadelphia, Pa.
Schieren Co., Chas. A., New York, N. Y.
Sikes Co., S. R., Minneapolis, Minn.
Williams & Son, I. B., Dover, N. H.

BELTING, FLAT, RUBBER

Boston Woven Hose & Rubber Co., Cambridge, Mass.
Dick Co., Inc., R. & J., Passaic, N. J.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Hamilton Rubber Mfg. Corp., Trenton, N. J.
Manheim Mfg. & Belting Co., Manheim, Pa.
New York Belting & Packing Co., Passaic, N. J.
Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O
Thermoid Co., Trenton, N. J.
United States Rubber Co., New York, N. Y.

BELTS, V

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
America Pulley Co., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Browning Mfg. Co., Inc., Maysville, Ky.
Chicago Belting Co., Chicago, Ill.
Continental Rubber Wks., Erie, Pa.
Dayton Rubber Co., Dayton, O.
Dick Co., Inc., R. & J., Passaic, N. J.
Dodge Mfg. Corp., Mishawaka, Ind.
Durkee-Atwood Co., Minneapolis, Minn.
Ft. Worth Steel & Machinery Co., Ft. Worth, Tex.
Gates Rubber Co., Denver, Colo.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Manheim Mfg. & Belting Co., Manheim, Pa.
Maurey Mfg. Corp., Chicago, Ill.
Medart Co., St. Louis, Mo.
New York Belting & Packing Co., Passaic, N. J.
Pyott Foundry & Machine Co., Chicago, Ill.
Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Rhoads & Sons, J. E., Philadelphia, Pa.
Schieren Co., Chas. A., New York, N. Y.
Thermoid Co., Trenton, N. J.
United States Rubber Co., New York, N. Y.
Wood's Sons Co., T. B., Chambersburg, Pa.
Worthington Corp., Harrison, N. J.

BENDERS, PIPE

American Pipe Bending Machine Co., Inc., Poultney, Vt.
American Pipe Tool Co., Chicago, Ill.
Blackhawk Mfg. Co., Milwaukee, Wis.
Buffalo Forge Co., Buffalo, N. Y.
Capewell Mfg. Co., Hartford, Conn.
Crown Die & Tool Co., Chicago, Ill. (Hand)
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
Holsclaw Bros., Inc., Evansville, Ind.
Hossfeld Mfg. Co., Winona, Minn.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Pacific Machine & Iron Wks., Tacoma, Wash.
Pedrick Tool & Machine Co., Philadelphia, Pa.
Pines Engineering Co., Inc., Aurora, Ill.
Radiant Devices, St. Louis, Mo.
Sac Tool Mfg. Co., St. Louis, Mo.
Solon Mfg. Co., Solon, O.
Tal Bender, Inc., Milwaukee, Wis.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Vanderman Mfg. Co., Willimantic, Conn.
Wallace Supplies Mfg. Co., Chicago, Ill.

BENDERS, TUBING

Blackhawk Mfg. Co., Milwaukee, Wis.
Bonney Forge & Tool Wks., Allentown, Pa.
Buffalo Forge Co., Buffalo, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Duro Metal Products Co., Chicago, Ill.
Everhot Products Co., Chicago, Ill.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
Griffith Equipment Co., Inc., Los Angeles, Calif.
Holsclaw Bros., Inc., Evansville, Ind.
Hossfeld Mfg. Co., Winona, Minn.
Imperial Brass Mfg. Co., Chcago, Ill.
Keeney Mfg. Co., Newington, Conn.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Pacific Machine & Iron Wks., Tacoma, Wash.
Parker Appliance Co., The, Cleveland, O.
Pedrick Tool & Machine Co., Philadelphia, Pa.
Pines Engineering Co., Inc., Aurora, Ill.
Republic Steel Corp., Steel and Tubes Div., Cleveland, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Solon Mfg. Co., Solon, O.
Steel City Electric Co., Pittsburgh, Pa.
Tal Bender, Inc., Milwaukee, Wis.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Wallace Supplies Mfg. Co., Chicago, Ill.

BENDS, EXPANSION, STEAM PIPE

Albert Pipe Supply Co., Brooklyn, N. Y.
American Locomotive Co., Alco Products Div., Dunkirk, N. Y.
Atlantic Pipe Bending & Fabricating Corp., Wood-Ridge, N. J.
Blaw-Knox Co., Power Piping and Sprinkler Div., Pittsburgh, Pa.
Clow & Sons, James B., Chicago, Ill.
Crane Co., Chicago, Ill.
Dravo Corp., Machinery Div., Pittsburgh, Pa.
Flori Pipe Co., The, St. Louis, Mo.
Grinnell Co., Inc., Providence, R. I.
Harris & Co., Arthur, Chicago, Ill. (Stainless & non-ferrous)
Kellogg Co., M. W., The, New York, N. Y. (Corrugated steel)
Lumsden & Van Stone Co., Div. of Midwest Piping & Supply Co., South Boston, Mass.
Marquette Coppersmithing Co., Philadelphia, Pa.
Midwest Piping Co., Inc., St. Louis, Mo.
Mitchell & Co., Inc., W. K., Philadelphia, Pa.
National Valve & Mfg. Co., Pittsburgh, Pa.
Ohio Pipe Bending & Machine Co., Cleveland, O.
Parks-Cramer Co., Fitchburg, Mass.
Pittsburgh Pipe Coil & Bending Co., Etna, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Rempe Co., Chicago, Ill.
Ric-wiL Co., The, Barberton, O.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Shaw Co., Benjamin F., Wilmington, Del.
Shaw-Kendall Engineering Co., Toledo, O.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Walworth Co., New York, N. Y.
Western Piping & Engineering Co., San Francisco, Calif.
Whitlock Mfg. Co., Hartford, Conn.

BI-METALS, THERMOSTATIC

Baker & Co., Inc., Newark, N. J.
Chace Co., W. M., Detroit, Mich.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Westinghouse Electric Corp., Pittsburgh, Pa.
Wilson Co., H. A., The, Union, N. J.

BLADES, PROPELLER FAN

Ackermann Mfg. Co., Wheeling, W. Va.
Aerovent Fan Co., Inc., Piqua, O.
Aire-Foile Fan & Blower Co., Detroit, Mich.
Airmaster Corp., Chicago, Ill.
Alliance Mfg. Co., Alliance, O.
Beckett & Co., Inc., Thomas, Dallas, Tex.
Bronson Fan Mfg. Co., Los Angeles, Calif.
Burden Co., Alan E., Los Angeles, Calif.
C & H Air Conditioning Fan Co., Inc., Atlanta, Ga.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Plainfield, N. J.
Circulators & Devices Mfg. Corp., Brooklyn, N. Y.
DeBothezat Fans Div., American Machine & Metals, Inc., East Moline Ill.
Dual-Air Fan Co., South Elgin, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
International Engrg. Inc., Dayton, O.
Koppers Co., Inc., Metal Products Div., Baltimore, Md.
Martin Fan & Blower Co., Chicago, Ill.
Meier Electric & Machine Co., Inc., Indianapolis, Ind.
Motionair Co., Los Angeles, Calif.
Myers Electric Co., Inc., Pittsburgh, Pa.
Panelyte Div., St. Regis Paper Co., New York, N. Y.
Peerless Electric Co., Warren, O.
Propellair Div., Robbins & Meyers Inc., Springfield, O.
Robinson Ventilating Co., Zelionople, Pa.
Roto-Beam, Chicago, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.
South Bend Air Products, Inc., South Bend, Ind.
Standard Electric Mfg. Co., West Berlin, N. J.
Thermal Industries, Indio, Calif.
Torrington Mfg. Co., Torrington, Conn.
Torrington Mfg. Co., The, Western Div., Van Nuys, Calif.
Wind-Way Fan & Ventilator Co., New Orleans, La.

BLAST GATES

See Gates, Blast

BLAST HEATERS

See Surface, Finned, Heating

BLAST HEATING COILS

See Surface, Finned, Heating

BLINDS, LINE, PIPE

Hamer Oil Tool Co., Long Beach, Calif.

BLOCKS, TERMINAL, FOR ELECTRICAL CONNECTIONS

General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Marathon Electric Mfg. Corp., Wausau, Wis.
Sealed Unit Parts Co., Inc., Bronx, N. Y.

BLOW PIPE FITTINGS

See Fittings, Blow Pipe

BLOWER FANS

See Fans, Axial Flow and Fans, Centrifugal

BLOWER HOUSINGS

See Housings, Fan

BLOWER WHEELS

See Wheels, Blower

BLOWERS, HIGH PRESSURE

For Low Pressure Blower Fans, See Fans, Centrifugal

Aladdin Heating Corp., Oakland, Calif.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Blower Corp., Detroit, Mich.
Bayley Blower Co., Milwaukee, Wis.
Beach-Russ Co., New York, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Carling Turbine Blower Co., Worcester, Mass.
Century Fan & Ventilator Co., Stamford, Conn.
Champion Blower & Forge Co., Lancaster, Pa.
Chicago Blower Corp., Franklin Park, Ill.
Clarage Fan Co., Kalamazoo, Mich.
Day Co., The, Minneapolis, Minn.
De Laval Steam Turbine Co., Trenton, N. J.
Dynamic Air Engineering, Inc., Los Angeles, Calif.
Eastern Air Devices, Inc., Brooklyn, N. Y.
Eclipse Fuel Engineering Co., Rockford, Ill.
Electric Sprayit Co., The, Sheboygan, Wis.
Frigid, Inc., Brooklyn, N. Y.
General Blower Co., Morton Grove, Ill.
Ilg Electric Ventilating Co., Chicago, Ill.
Ingersoll-Rand Co., New York, N. Y.
Iron Fireman Mfg. Co., Cleveland, O.
Joy Mfg., Pittsburgh, Pa.
Lammert & Mann Co., Chicago, Ill.
Lamson Corp., Blower Div., Syracuse, N. Y.
Martin Fan & Blower Co., Chicago, Ill.
North American Mfg. Co., Cleveland, O.
Peerless Electric Co., Warren, O.
Power Engineering Co., Chicago, Ill.
Prat-Daniel Corp., South Norwalk, Conn.
Read Standard Corp., Blower-Stoker Div., York, Pa.
Ripley Co., Inc., L-R Blower Div., Middletown, Conn.
Roots-Connersville Blower Corp., Connersville, Ind.
Spencer Turbine Co., Hartford, Conn.
Standard Electric Mfg. Co., West Berlin, N. J.
Trane Co., The, La Crosse, Wis.
United States Air Conditioning Corp., Minneapolis, Minn.
Utility Appliance Corp., Los Angeles, Calif.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wing Mfg. Co., L. J., Linden, N. J.

BLOWERS, SOOT

Bayer Co., St. Louis, Mo.
Chesterton Co., A. W., Everett, Mass.
Copes-Vulcan Div., Continental Foundry & Machine Co., Erie, Pa.
Diamond Power Specialty Corp., Lancaster, O.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Marion Machine Foundry & Supply Co., Marion, Ind.
Perfection Grate & Stoker Co., Springfield, Mass.

BLOW-OFF VALVES

See Valves, Blow-of

BLUE PRINT MACHINES

See Machines, Blue Print and White Print

BOARDS, PANEL AND CONTROL

Aqua Electric Scale Control, Inc., Cleveland, O.
Automatic Switch Co., Orange, N. J.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hays Corp., Michigan City, Ind.
Iron Fireman Mfg. Co., Cleveland, O.
Littleford Bros., Inc., Cincinnati, O.
Marsh Heating Equipment Co., Skokie, Ill.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Square D Co., Detroit, Mich.
Taller & Cooper, Inc., Brooklyn, N. Y.
Trerice Co., H. O., Detroit, Mich.
Westinghouse Electric Corp., Pittsburgh, Pa.

BOILER CLEANING COMPOUNDS

See Compounds, Boiler Cleaning

BOILER FEED PUMPS

See Pumps, Boiler Feed

BOILER FEEDERS

See Feeders, Water, Heating Boiler

BOILER GAGES

See Gages, Liquid Level

BOILER OBSERVATION PORTS

See Ports, Observation, Boiler

BOILER SEALING COMPOUNDS

See Compounds, Boiler and Radiator Sealing

BOILER AND TANK INSULATION

See Insulation, Boiler and Tank

BOILER TUBES

See Tubes, Boiler

BOILER WATER ALARMS

See Alarms, High and Low Boiler Water

BOILERS, ELECTRIC

See Generators, Steam, Electric

BOILERS, HEATING, CAST IRON, SECTIONAL

2000 Sq Ft Steam Radiation and Over

American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Bastian-Morley Co., Inc., LaPorte, Ind.
Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O.

Burnham Corp., Boiler Div., Irvington, N. Y.
Crane Co., Chicago, Ill.
Dunkirk Radiator Corp., Dunkirk, N. Y.
Mueller Furnace Co., L. J., Milwaukee, Wis.
National Radiator Co., The, Johnstown, Pa.
Norge Heat Div., Borg-Warner Corp., Kalamazoo, Mich.
Peerless Heater Div., The Eastern Foundry Co., Boyertown, Pa (gas fired)
Pennsylvania Furnace & Iron Co., Warren, Pa.
Prox Co., Inc., Frank, Terre Haute, Ind.
Richmond Radiator Co., Metuchen, N. J.
Smith Co., Inc., H. B., The, Westfield, Mass.
Surface Combustion Corp., Toledo, O.
United States Radiator Corp., Detroit, Mich.
Weil-McLain Co., Michigan City, Ind.

BOILERS, HEATING, STEEL, FIRE TUBE

2000 Sq Ft Steam Radiation and Over

Aldrich Co., Wyoming, Ill.
Alert Boiler & Mfg. Co., Detroit, Mich.
American Shipbuilding Co., Cleveland, O.
Ames Iron Works, Inc., Oswego, N. Y.
Atlantic Steel Boiler Co., Philadelphia, Pa.
Bigelow Co., New Haven, Conn.
Birchfield Boiler, Inc., Tacoma, Wash.
Boiler Engineering & Supply Co., Inc., Phoenixville, Pa.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Burnham Corp., Boiler Div., Irvington, N. Y.
Combustion Engineering, Inc., New York, N. Y.
Dewey-Shepard Boiler Co., Indianapolis, Ind.
Crotty Mfg. Corp., Flushing, L. I., N. Y.
Dillon Steam Boiler Wks., Inc., D. M., Fitchburg, Mass.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Edge Moor Iron Works, Inc., Edge Moor, Del.
Erie City Iron Wks., Erie, Pa.
Farrar & Trefts, Buffalo, N. Y.
Fitzgibbons Boiler Co., Inc., New York, N. Y.
Frost Mfg. Co., Galesburg, Ill.
Hamburg Boiler Works, Inc., Hamburg, Pa.
Hodge Boiler Wks., East Boston, Mass.
International Engineering Wks., Inc., Framingham, Mass.
Johnston Bros., Inc., Ferrysburg, Mich.
Kewanee-Ross Corp., Kewanee, Ill.
Leffel & Co., James, Springfield, O.
Lookout Boiler & Mfg. Co., Chattanooga, Tenn.
Mt. Hawley Mfg. Co., Inc., Peoria, Ill.
Mund Boilers, Inc., Los Angeles, Calif.
Murray Iron Wks. Co., Burlington, Ia.
National Radiator Co., The, Johnstown, Pa.
Norse Boiler Co., Inc., New Market, N. J.
Orr & Semblower, Inc., Reading, Pa.
Pacific Steel Boiler Div., United States Radiator Corp., Detroit, Mich
Portmar Boiler Co., Inc., Brooklyn, N. Y.
Republic Boiler Corp., New York, N. Y.
Rite Engineering & Mfg. Corp., Los Angeles, Calif.
Smith Twin Tubular Boiler Co., Inc., Philadelphia, Pa.
Spencer Heater, Lycoming Division, Avco Mfg. Corp., Williamsport, Pa.
Stout & Sons, David, St. Louis, Mo.
Terre Haute Boiler Works Co., Terre Haute, Ind.
Titusville Iron Wks. Co., The, Titusville, Pa.
Wickes Boiler Co., Saginaw, Mich.

BOILERS, HEATING, STEEL, WATER TUBE

Anetsberger Bros., Inc., Northbrook, Ill.
Babcock & Wilcox Co., New York, N. Y.
Bigelow Co., The, New Haven, Conn.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Bryan Steam Corp., Peru, Ind.
Central States Steel Boiler Co., Chicago, Ill.
Columbia Boiler Co., Pottstown, Pa.
Combustion Engineering, Inc., New York, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Crotty Mfg. Corp., Flushing, L. I., N. Y.
Edge Moor Iron Wks., Inc., Edge Moor, Del.
Erie City Iron Wks., Erie, Pa.
International Boiler Wks. Co., The, East Stroudsburg, Pa.
Keeler Co., E., Williamsport, Pa.
Koven & Bro., L. O., Inc., Jersey City, N. J.
Morheat Corp., Lansing, Mich.
Mund Boilers, Inc., Los Angeles, Calif.
Murray Iron Wks., Co., Burlington, Ia.
Parker Boiler Mfg. Co., Sid E., Los Angeles, Calif.
Riley Stoker Corp., Worcester, Mass.
Springfield Boiler Co., Springfield, Ill. (750 to 25,000 lb per hr, 160 psi and above, gas and oil fired)
Titusville Iron Works Co., The, Titusville, Pa.
V. & E. Products, Inc., Schuylkill Haven, Pa.
Viking Mfg. Corp., Cleveland, O.
Vogt Machine Co., Henry, Louisville, Ky.
Waterfilm Boilers, Inc., Jersey City, N. J.
Wickes Boiler Co., Saginaw, Mich.
Zingheim Co., William C., Chicago, Ill.

BOILERS, PACKAGED UNITS, HEATING AND PROCESS—*including Controls, Feed Pump, etc.*

Ames Iron Works, Inc., Oswego, N. Y.
Babcock & Wilcox Co., New York, N. Y.
Bigelow Co., The, New Haven, Conn.
Boiler Engineering & Supply Co., Phoenixville, Pa.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Clayton Mfg. Co., El Monte, Calif.
Cleaver-Brooks Co., Milwaukee, Wis.
Columbia Boiler Co., Pottstown, Pa.
Combustion Engineering, Inc., New York, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Consolidated Boiler Corp., Boston, Mass.
Cyclotherm Div., United States Radiator Corp., Oswego, N. Y.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Edge Moor Iron Works, Inc., Edge Moor, Del.
Erie City Iron Works, Erie, Pa.
Foster Wheeler Corp., New York, N. Y.
Hoffberger Co., C., Baltimore, Md. (12 to 600 hp, oil fuel, 15 to 150 psi)
Iron Fireman Mfg. Co., Cleveland, O.
Johnston Bros., Inc., Ferrysburg, Mich.
Keeler Co., E., Williamsport, Pa.
Kewanee-Ross Corp., Kewanee, Ill.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Lattner Mfg. Co., P. M., Cedar Rapids, Iowa
Leffel & Co., James, Springfield, O.
Littleford Bros., Inc., Cincinnati, O.
Martin Co., Inc., J. O., San Francisco, Calif.
Mears-Kane-Ofeldt, Inc., Div. S. T. Johnson Co., Bridgeport, Pa.
Mund Boilers, Inc., Los Angeles, Calif.
Orr & Sembower, Inc., Reading, Pa.
Parker Boiler Mfg. Co., Sid E., Los Angeles, Calif.
Petro, Cleveland, O.
Preferred Utilities Mfg. Corp., New York, N. Y.
Ray Oil Burner Co., San Francisco, Calif.
SelecTemp Div., Iron Fireman Mfg. Co., Cleveland, O.
Sellers Engineering Co., Chicago, Ill.
Springfield Boiler Co., Springfield, Ill.
Superior Combustion Industries, Inc., New York, N. Y.
Texsteam Corp., Houston, Tex.
Titusville Iron Works Co., The, Titusville, Pa.
Union Iron Works, Erie, Pa.
Vapor Heating Corp., Chicago, Ill.
Wickes Boiler Co., Saginaw, Mich.
York-Shipley, Inc., York, Pa.

BOLTS, EXPANSION

Chase Brass & Copper Co., Waterbury, Conn.
Chicago Expansion Bolt Co., Chicago, Ill.
Diamond Expansion Bolt Co., Inc., Garwood, N. J.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Industrial Screw Co., Chicago, Ill.
Kenney Co., L. C., Chicago, Ill.
Mastercraft Plastics Co., Inc., Jamaica, N. Y.
National Lead Co., New York, N. Y.
Paine Co., Addison, Ill.
Polis Mfg. Co., J. D., Chicago, Ill.
Rawlplug Co., Inc., The, New York, N. Y.
Star Expansion Bolt Co., New York, N. Y.
Star Stainless Screw Co., Paterson, N. J.
U. S. Expansion Bolt Co., York, Pa.

BOLTS AND STUDS, FLANGE

Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bolt Co., Div. of Buffalo-Eclipse Corp., North Tonawanda, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Clark Bros. Bolt Co., Milldale, Conn.
Continental Screw Co., New Bedford, Mass.
Crane Co., Chicago, Ill.
Erie Bolt & Nut Co., Erie, Pa.
Harper Co., H. M., Morton Grove, Ill.
Haskell Mfg. Co., Wm. H., Pawtucket, R. I.
Industrial Screw Co., Chicago, Ill.
Lamson & Sessions Co., Cleveland, O.
Polis Mfg. Co., J. D., Chicago, Ill.
Republic Steel Corp., Bolt & Nut Div., Cleveland, O.
Rockford Screw Products Co., Rockford, Ill.
Russell, Purdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Star Stainless Screw Co., Paterson, N. J.
Victor Products Corp., Chicago, Ill.

BOLTS, TOGGLE AND ANCHOR

Carpenter & Paterson, Inc., East Boston, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Expansion Bolt Co., Chicago, Ill.
Crawford Co., Chicago, Ill.
Diamond Expansion Bolt Co., Inc., Garwood, N. J.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Industrial Screw Co., Chicago, Ill.
Moore, Inc., Goodloe E., Danville, Ill.
Paine Co., Addison, Ill.
Polis Mfg. Co., J. D., Chicago, Ill.

Rawlplug Co., Inc., The, New York, N. Y.
Republic Steel Corp., Cleveland, O.
Star Expansion Bolt Co., New York, N. Y.
Star Stainless Screw Co., Paterson, N. J.
U. S. Expansion Bolt Co., York, Pa.

BOOSTERS, GAS

Beach-Russ Co., New York, N. Y.
Eclipse Fuel Engineering Co., Rockford, Ill.
North American Mfg. Co., Cleveland, O.
Roots-Connersville Blower Div., Connersville, Ind.

BOOTHS, PAINTING, SPRAY

Binks Mfg. Co., Chicago, Ill.
Black Mfg. Co., The, Harrison, N. J.
Carolina Blower Co., Inc., Greensboro, N. C.
Centri-Spray Corp., Detroit, Mich. (wet type)
Circulators & Devices Mfg. Corp., Brooklyn, N. Y.
DeVilbiss Co., The, Toledo, O.
Electric Sprayit Co., The, Sheboygan, Wis.
Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Kirk & Blum Mfg. Co., Cincinnati, O.
Lumm Co., A. H., Toledo, O.
Mahon Co., R. C., The, Detroit, Mich.
M & E Mfg. Co., Indianapolis, Ind.
Newcomb-Detroit Co., Detroit, Mich.
Peters-Dalton, Inc., Detroit, Mich.
Plummer Spray Equipment Co., Napolean, O.
Schmieg Industries, Detroit, Mich.
Spray Engineering Co., Somerville, Mass.
Young & Bertke Co., Cincinnati, O.

BRAKES, SHEET METAL, HAND

Barth Engineering & Mfg. Co., Milldale, Conn.
Dreis & Krump Mfg. Co., Chicago, Ill.
Eiker Mfg. Co., Ogallala, Neb.
Excelsior Tool & Machine Co., East St. Louis, Ill.
Niagara Machine & Tool Works, Buffalo, N. Y.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.
St. Louis Tool Co., St. Louis, Mo.
Webb Machine & Tool Co., Imperial, Pa.
Whitney Metal Tool Co., Rockford, Ill.

BRAKES, SHEET METAL, PORTABLE

Barth Engineering & Mfg. Co., Milldale, Conn.
Dreis & Krump Mfg. Co. Chicago, Ill.
Eiker Mfg. Co., Ogallala, Neb.
Harris, A. R., Hammond, Ind.
Niagara Machine & Tool Wks., Buffalo, N. Y.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Webb Machine & Tool Co., Imperial, Pa.
Whitney Metal Tool Co., Rockford, Ill.

BRAKES, SHEET METAL, POWER

Bath Co., Cyril, The, Cleveland, O.
Cincinnati Shaper Co., Cincinnati, O.
Diamond Machine Tool Co., Pico, Calif.
Dreis & Krump Mfg. Co., Chicago, Ill.
Heartley Machine & Tool Co., Toledo, O.
Munton Mfg. Co., Franklin Park, Ill.
Niagara Machine & Tool Wks., Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Verson Allsteel Press Co., Chicago, Ill.
Verson Mfg. Co., The, Dallas, Tex.
Whitney Metal Tool Co., Rockford, Ill.

BRASS PIPE

See Pipe, Brass and Copper

BRASS TUBING

See Tubing, Brass and Copper

BRASS UNIONS

See Unions, Brass

BRASS VALVES

See Valves, Gate; and Valves, Globe

BRAZING TORCHES

See Torches, Brazing

BREAKERS, VACUUM (For Steam Using Equipment)

Associated Valve & Engineering Co., Chicago, Ill.
Bailey Co., Chas. M., San Francisco, Calif.
Simplex Valve & Meter Co., Philadelphia, Pa.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
McAlear Mfg. Co., Chicago, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Co., Indianapolis, Ind.
Thrush & Co., H. A., Peru, Ind.
Webster & Co., Warren, Camden, N. J.

BRONZE VALVES

See Valves, Gate; and Valves, Globe

BUILDING INSULATION

See Insulation, Building

BURNERS, GAS, COMMERCIAL AND INDUSTRIAL

Adams Mfg. Co., Cleveland, O.
Anchor Div., Stratton & Terstegge Co., Inc., New Albany, Ind.
Aston Products, Inc., Hazel Park, Mich.
Automatic Firing Corp., St. Louis, Mo.
Barber Gas Burner Co., Cleveland, O.
Barton Co., Minneapolis, Minn.
Beck Engineering Combustion Kompany, St. Louis, Mo.
Best Combustion Equipment Co., Inc., W. N., Carlstadt, N. J.
Bryant Corp., C. L., Cleveland, O.
Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O.
Burdette Mfg. Co., Chicago, Ill.
Central States Mfg. Co., Inc., Arkansas City, Kan.
Certified Furnace Co., Div. Stainless & Steel Products Co., St. Paul, Minn.
Cleaver-Brooks Co., Milwaukee, Wis.
Coen Co., San Francisco, Calif.
Coppus Engineering Corp., Worcester, Mass.
Dalzen Mfg. Co., St. Clair, Mich.
Eclipse Fuel Engrg. Co., Rockford, Ill.
Engineer Co., New York, N. Y.
Faber Engineering Co., Inc., Philadelphia, Pa.
Forney Engineering Co., Dallas, Tex.
Fuelgaurd Co., Dallas, Tex.
Gordon & Piatt, P. O. Box 331, Winfield, Kan.
Haney Gas Burner & Engineers, Monrovia, Calif.
Hauck Mfg. Co., Brooklyn, N. Y.
Iron Fireman Mfg. Co., Cleveland, O.
Jackson & Church Co., Saginaw, Mich.
Jamieson Mfg. Co., Dallas, Tex.
Jerry Finn Engineers, St. Paul, Minn.
Johnson Gas Appliance Co., Cedar Rapids, Ia.
Kemp Mfg. Co., C. M., Baltimore, Md.
Kindl-Air Corp., Cleveland, O.
Laharco Industries, Minneapolis, Minn.
Leahy Mfg. Co., Los Angeles, Calif.
Lientz Co., B. P., Kansas City, Mo.
Mahr Mfg. Co., Div., of Diamond Iron Wks., Inc., Minneapolis, Minn.
Martin Co., Inc., J. O., San Francisco, Calif.
Mettler Co., Inc., The, Los Angeles, Calif.
Mid-Continent Metal Products Co., Chicago, Ill.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Newcomb-Detroit Co., Detroit, Mich.
Norman Products Co., Inc., Columbus, O.
North American Mfg. Co., Cleveland, O.
Orr & Sembower, Inc., Reading, Pa.
Peabody Engrg. Corp., New York, N. Y.
Petro, Cleveland, O.
Ray Oil Burner Co., San Francisco, Calif.
Rayfield, C. L., Chicago, Ill.
Roberts-Gordon Appliance Corp., Buffalo, N. Y.
Rockwell Co., W. S., Fairfield, Conn.
Selas Corp. of America, Philadelphia, Pa.
Sellers Engineering Co., Chicago, Ill.
Siemon Mfg. Co., Kansas City, Mo.
Sonner Burner Co., Winfield, Kan.
Standard Fuel & Engineering Co., Detroit, Mich.
Staples & Pfeiffer, San Francisco, Calif.
Stout & Sons, David, St. Louis, Mo.
Sullivan Valve & Engineering Co., Butte, Mont.
Superior Combustion Industries, Inc., New York, N. Y.
Surface Combustion Corp., Toledo, O.
Thermapanels, Inc., Santa Clara, Calif.
Todd Shipyards Corp., Combustion Equipment Div., Elmhurst, N. Y.
Vapofier Corp., Chicago, Ill.
Webster Engineering Co., Tulsa, Okla.
Williams Div., Eureka Williams Corp., Bloomington, Ill.
Zink Co., John, Tulsa, Okla.
Zurn Mfg. Co., J. A., Industrial Div., Erie, Pa.

BURNERS, GAS, COMMERCIAL AND INDUSTRIAL, COMBINED WITH STOKER OR OVER COAL GRATES

Forney Engineering Co., Dallas, Tex.
Lientz Co., B. P., Kansas City, Mo.
Mettler Co., Inc., The, Los Angeles, Calif.
Radiant Combustion System, Inc., New York, N. Y.
Webster Engineering Co., Tulsa, Okla.

BURNERS, GAS AND OIL COMBINED, COMMERCIAL AND INDUSTRIAL

Ace Engineering Co., Chicago, Ill.
Automatic Firing Corp., St. Louis, Mo.
Babcock & Wilcox Co., New York, N. Y.
Barber Gas Burner Co., Cleveland, O.
Beck Engineering Combustion Kompany, St. Louis, Mo.
Best Combustion Equipment Co., Inc., W. N., Carlstadt, N. J.
Cleaver-Brooks Co., Milwaukee, Wis.
Coen Co., San Francisco, Calif.
Coppus Engineering Corp., Worcester, Mass.
Eclipse Fuel Engineering Co., Rockford, Ill.
Engineer Co., New York, N. Y.
Enterprise Engine & Machinery Co., Subsidiary of General Metals Corp., San Francisco, Calif.

Faber Engineering Co., Inc., Philadelphia, Pa.
Forney Engineering Co., Dallas, Tex.
Haney Gas Burner & Engineers, Monrovia, Calif.
Hauck Mfg. Co., Brooklyn, N. Y.
Iron Fireman Mfg. Co., Cleveland, O.
Johnson Co., S. T., Bridgeport, Pa. (high pressure atomizing)
Lammert & Mann Co., Chicago, Ill.
Leahy Mfg. Co., Los Angeles, Calif.
Lientz Co., B. P., Kansas City, Mo.
Mahr Mfg. Co., Div. of Diamond Iron Wks., Inc., Minneapolis. Minn.
Mettler Co., Inc., The, Los Angeles, Calif.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Norman Products Co., Inc., Columbus, O.
North American Mfg. Co., Cleveland, O.
Orr & Sembower, Inc., Reading, Pa.
Peabody Engineering Corp., New York, N. Y.
Petro, Cleveland, O.
Preferred Utilities Mfg. Corp., New York, N. Y.
Quiet Automatic Oil Burner Corp., Newark, N. J.
Ray Oil Burner Co., San Francisco, Calif.
Rockwell Co., W. S., Fairfield, Conn.
Siemon Mfg. Co., Kansas City, Mo.
Simplex Oil Heating Corp., Philadelphia, Pa.
Sonner Burner Co., Winfield, Kan.
Staffco Engrg. Corp., Chicago, Ill.
Staples & Pfeiffer, San Francisco, Calif.
Stout & Sons, David, St. Louis, Mo.
Superior Combustion Industries, Inc., New York, N. Y.
Surface Combustion Corp., Toledo, O.
Synchronous Flame, Inc., Chicago, Ill.
Todd Shipyards Corp., Combustion Equipment Div., Elmhurst, N. Y.
Webster Engineering Co., Tulsa, Okla.
York-Shipley, Inc., York, Pa.
Zink Co., John, Tulsa, Okla.

BURNERS, OIL, COMMERCIAL AND INDUSTRIAL

Ace Engineering Co., Chicago, Ill. (Rotary)
Airtemp, Div. of Chrysler Corp., Dayton, O.
Aldrich Co., Wyoming, Ill.
Anchor Div., Stratton & Terstegge Co., Inc., New Albany, Ind.
Auburn Burner Co., Auburn, Ind.
Automatic Firing Corp., St. Louis, Mo.
Babcock & Wilcox Co., New York, N. Y.
Barber Gas Burner Co., Cleveland, O.
Beckett Corp., R. W., Elyria, O.
Best Combustion Equipment Co., Inc., W. N., Carlstadt, N. J.
Century Engrg. Corp., Cedar Rapids, Ia. (high pressure atomizing)
Certified Furnace Co., Div. Stainless & Steel Products Co., St. Paul, Minn.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Cleaver-Brooks Co., Milwaukee, Wis.
Coen Co., San Francisco, Calif.
Columbia Boiler Co., Pottstown, Pa.
Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill.
Dalmo-Victor Co., San Carlos, Calif.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
Delta Heating Corp., Trenton, N. J. (high pressure)
Dewey-Shepard Boiler Co., Indianapolis, Ind. (high pressure & low pressure)
Diamond Iron Works Co., Minneapolis, Minn. (High Pressure-Gun Type)
Diesel Oil Burner Corp. of New York, Jamaica, Long Island, N. Y.
Drying Systems, Inc., Chicago, Ill.
Eckhart Mfg. Co., Inc., Union, N. J. (High pressure atomizing)
Eclipse Fuel Engineering Co., Rockford, Ill.
Eds-Wil Burner Corp., Chicago, Ill.
Electrol Burner Mfg. Co., Inc., Rutherford, N. J. (high pressure atomizing)
Engineering Co., New York, N. Y.
Enterprise Engine & Machine Co., Subsidiary of General Metals Corp., San Francisco, Calif.
Faber Engineering Co., Inc., Philadelphia, Pa.
Fano-Flame Oil Burner Corp., Huntington Park, Calif.
Federal Oil Burner Co., Inc., Philadelphia, Pa. (rotary)
Forney Engineering Co., Dallas, Tex. (both steam atomizing & mechanical, high pressure)
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Gold Star Oil Burner Mfg. Co., Inc., Yonkers, N. Y.
Haney Gas Burner & Engineers, Monrovia, Calif. (steam atomizing)
Hardinge Oil Burner & Mfg. Co., Chicago, Ill.
Hauck Mfg. Co., Brooklyn, N. Y.
Iron Fireman Mfg. Co., Cleveland, O. (Rotary atomizing, high pressure atomizing)
Jackson & Church Co., Saginaw, Mich.
Johnson Co., S. T., Bridgeport, Pa. (Horizontal rotary)
Kleen-Heet, Inc., Chicago, Ill.
Kol-Master Corp., Oregon, Ill. (high pressure)
Lammert & Mann Co., Chicago, Ill.
Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y. (horizontal rotary: belt & direct drives)
Leahy Mfg. Co., Los Angeles, Calif.
Lieblich Oil Burner Inc., New York, N. Y.
Lientz Co., B. P., Kansas City, Mo. (steam atomizing)
Mahr Mfg. Co., Div. of Diamond Iron Wks., Inc., Minneapolis, Minn.
Malleable Iron Fittings Co., Branford, Conn.
Mettler Co., Inc., The, Los Angeles, Calif. (high pressure atomizing and steam atomizing)
Montag Stove & Furnace Works, Portland, Ore.
Mt. Hawley Mfg. Co., Inc., Peoria, Ill.
National Airoil Burner Co., Inc., Philadelphia, Pa.
National Oil Burner Co. of N. Y. Inc., Brooklyn, N. Y. (Horizontal rotary)
Norge Heat Div., Borg-Warner Corp., Kalamazoo, Mich.
North American Mfg. Co., Cleveland, O.
Nu-Way Corp., The, Rock Island, Ill.
Orr & Sembower, Inc., Reading, Pa. (air-atomizing)
Peabody Engrg. Corp., New York, N. Y.
Petro, Cleveland, O.
Preferred Utilities Mfg. Corp., New York, N. Y.
Quiet Automatic Oil Burner Corp., Newark, N. J. (high pressure atomizing)
Quiet-Heet Mfg. Corp., Newark, N. J.
Radiant Combustion System, Inc., New York, N. Y.
Radiant Utilities Corp., Brooklyn, N. Y. (high pressure)
Ray Oil Burner Co., San Francisco, Calif. (High pressure atomizing rotary)
Rayfield Co., C. L., Chicago, Ill. (Low pressure atomizing and Horizontal Rotary)
Reif-Rexoil, Inc., Buffalo, N. Y.
Riley Stoker Corp., Worcester, Mass.
Rockwell Co., W. S., Fairfield, Conn.
Schurs Oil Burner Co., Los Angeles, Calif.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Siemon Mfg. Co., Kansas City, Mo.
Simplex Oil Heating Corp., Philadelphia, Pa. (Low and high pressure atomizing, and horizontal rotary types)
Staffco Engrg. Corp., Chicago, Ill.
Staples & Pfeiffer, San Francisco, Calif. (High pressure and steam atomizing, variable capacity)
Sun-Ray Burner Mfg. Corp., Jamaica, N. Y.
Superior Combustion Industries, Inc., New York, N. Y. (rotary)
Synchronous Flame, Inc., Chicago, Ill.
Timken Silent Automatic Div., Timken-Detroit Axle Co., Jackson, Mich.
Todd Shipyards Corp., Combustion Equipment Div., Elmhurst, N. Y. (Variable capacity, rotary, pressure atomizing, steam atomizing)
U. S. Machine Corp., Div. of Stewart-Warner Corp., Lebanon, Ind.
United States Radiator Corp., Detroit, Mich.
Vapofier Corp., Chicago, Ill. (Pre-mixed gaseous fuel generator)
Webster Engineering Co., Tulsa, Okla.
Will-Burt Co., The, Orrville, O. (High pressure)
Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington, Ill.
York-Shipley, Inc., York, Pa. (Rotary, high pressure atomizing)
Zink Co., John, Tulsa, Okla.

BURNERS, PULVERIZED COAL, COMMERCIAL AND INDUSTRIAL

Babcock & Wilcox Co., New York, N. Y.
Combustion Engineering, Inc., New York, N. Y.
Iron Fireman Mfg. Co., Cleveland, O.
Peabody Engineering Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.
Whiting Corp., Harvey, Ill.

BURNERS, PULVERIZED COAL AND GAS, COMBINED, COMMERCIAL AND INDUSTRIAL

Babcock & Wilcox Co., New York, N. Y.
Combustion Engineering, Inc., New York, N. Y.
Foster Wheeler Corp., New York, N. Y.
Iron Fireman Mfg. Co., Cleveland, O.
Peabody Engineering Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.

BURNERS, PULVERIZED COAL, GAS AND OIL COMBINED

Babcock & Wilcox Co., New York, N. Y.
Combustion Engineering, Inc., New York, N. Y.
Iron Fireman Mfg. Co., Cleveland, O.
Peabody Engineering Corp., New York, N. Y.

BURNERS, PULVERIZED COAL AND OIL, COMBINED, COMMERCIAL AND INDUSTRIAL

Babcock & Wilcox Co., New York, N. Y.
Blokolgas System, Inc., Detroit, Mich.
Combustion Engineering, Inc., New York, N. Y.
Engineer Co., New York, N. Y.
Foster Wheeler Corp., New York, N. Y.
Iron Fireman Mfg. Co., Cleveland, O.
Peabody Engineering Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.

CABINETS FOR AIR CONDITIONERS, BOILERS, ETC.

See Parts For Heating and Air Conditioning Equipment

CABLE, ELECTRIC HEATING

Chester Cable Corp., Chester, N. Y.
General Electric Co., Construction Materials Div., Bridgeport, Conn.
Gro-Quick Co., Chicago, Ill.
Roberson Co., L. N., Seattle, Wash.
Wesix Electric Heater Co., San Francisco, Calif.

CABLE, THERMOSTAT

Chester Cable Corp., Chester, N. Y.
Roberson Co., L. N., Seattle, Wash.
United States Rubber Co., New York, N. Y.

CALCULATORS, AIR CONDITIONING, HEATING, VENTILATING, AND PIPING; SLIDE RULE

Airserco Mfg. Co., Inc., Pittsburgh, Pa.
Calculator Specialties Co., Chicago, Ill.
Climatemaker Heat Loss Calculator Co., Bloomington, Ill.
Graphic Calculator Co., Chicago, Ill.
Morton Engineering Service, Paul S., Lawrence, Mich. (Btu calculator, area and volume calculator and temperature difference convertor calculator)

CAPILLARY TUBING

See Tubing, Capillary

CAPS, VENT FLUE

Accurate Sheet Metal Mfg. Works, Chicago, Ill.
Adams Co., The, Dubuque, Iowa
Airjet Ventilator Co., Pasadena, Calif.
Ammerman Co., C. L., Minneapolis, Minn.
Breidert Co., G. C., Los Angeles, Calif.
Excelsior Steel Furnace Co., The, Chicago, Ill.
General Ceramics & Steatite Corp., Keasbey, N. J. (acid proof)
Oil Equipment Mfg. Corp., New Haven, Conn.
Penn Ventilator Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Wallace Co., William, Metalbestos Div., Belmont, Calif.
Waverly Heating Supply Co., Boston, Mass.

CARBON DIOXIDE ANALYZERS

See Analyzers, Carbon Dioxide, Portable

CARBON DIOXIDE INDICATORS

See Indicators, Carbon Dioxide, Boiler Room

CARBON PIPE, TUBING, FITTINGS AND VALVES

See Pipe, Tubing, Fittings and Valves, Carbon and Graphite

CAST IRON PIPE

See Pipe, Cast Iron

CEMENT AND COMPOUNDS, PIPE JOINT

Acme Refining Co., The, Cleveland, O.
Acorn Refining Co., Cleveland, O.
Akron Metallic Gasket Co., Akron, O.
Arco Co., The, Cleveland, O.
Armite Laboratories, Los Angeles, Calif.
Atlas Chemical Co., Marietta, O.
Babbitt Chemical Specialties Co., New Bedford, Mass.
Baer Bros., New York, N. Y.
Black Magic Products Co., Tulsa, Okla.
Black & White Chemical Co., New York, N. Y.
Blue Ridge Talc Co., Inc., Henry, Va.
Blue Seal Chemical Co., Roselle Park, N. J.
Bowser, Inc., Fort Wayne, Ind.
Cabot, Inc., Samuel, Boston, Mass.
Calbar Paint & Varnish Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Chicago Gasket Co., Chicago, Ill.
Chicago Specialty Mfg. Co., Chicago, Ill.
Continental Products Co., Euclid, O.
Crane Co., Chicago, Ill.
Crane Packing Co., Chicago, Ill.
Croll & Son, Jesse G., Philadelphia, Pa.
Diamond Chemical Products, New York, N. Y.
Dixon Crucible Co., Joseph, Jersey City, N. J.
Felt Products Mfg. Co., Chicago, Ill.
Flexrock Co., Philadelphia, Pa.
Garlock Packing Co., Palmyra, N. Y.
Gasoilair Equipment Co., New Haven, Conn.
Greene, Tweed & Co., North Wales, Pa.
Grinnell Co., Inc., Providence, R. I.
Hercules Chemical Co., Inc., New York, N. Y.
Hetzel Roofing Products Co., Newark, N. J.
Highside Chemicals Co., Clifton, N. J.
Horn Co., Inc., A. C., Long Island City, N. Y.
Illinois Oil Products, Inc., Rock Island, Ill.
Jet-Lube, Inc., Los Angeles, Calif.
Kenite Laboratory, Inc., Madison, N. J.
Key Co., East St. Louis, Ill.
Keystone Asphalt Products Co., Chicago, Ill.
Krehbiel Co., J. H., Chicago, Ill.
Lake Chemical Co., Chicago, Ill.
Lastik Products Co., Inc., Pittsburgh, Pa.
Macksons Co., New York, N. Y.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Milwaukee Gas Specialty Co., Milwaukee, Wis.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Montgomery Bros., San Francisco, Calif.
National Engineering Products, Inc., Washington, D. C
Nebel Mfg. Co., Cleveland, O.
Oil Equipment Mfg. Corp., New Haven, Conn.
Parker Appliance Co., The, Cleveland, O.
Pecora Paint Co., Inc., Philadelphia, Pa.
Permatex Co., Inc., Brooklyn, N. Y.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Radiator Specialty Co., Charlotte, N. C.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Rutland Fire Clay Co., Rutland, Vt.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Sauereisen Cements Co., Pittsburgh, Pa.
Saverite Engineering Co., Hoboken, N. J.
Schundler & Co., F. E., Long Island City, N. Y.
Smooth-On Mfg. Co., Jersey City, N. J.
Spring Packing Corp., Chicago, Ill.
Sulflo, Inc., Elizabeth, N. J.
Technical Products Co., Sharpsburg, Pa.
Triangle Conduit & Cable Co., Inc., New Brunswick, N. J.
United States Stoneware Co., New York, N. Y.
Utility Laboratory, Inc., Brooklyn, N. Y.
Wilhelm Co., A., Reading, Pa.
X Laboratories, Inc., New York, N. Y.
X-Pando Corp., Long Island City, N. Y.

CEMENT, FURNACE

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Armstrong Co., Detroit, Mich.
Armstrong Cork Co., Lancaster, Pa.
Babcock & Wilcox Co., New York, N. Y.
Botfield Refractories Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Chicago Fire Brick Co., Chicago, Ill.
Chicago Specialty Mfg. Co., Chicago, Ill.
Clinton Metallic Paint Co., Clinton, N. Y. (Asbestos)
Continental Products Co., Euclid, O.
Foster Co., Benjamin, Philadelphia, Pa.
Green Fire Brick Co., Mexico, Mo.
Hercules Chemical Co., Inc., New York, N. Y.
Hetzel Roofing Products Co., Newark, N. J.
Johns-Manville, New York, N. Y.
Krehbiel Co., J. H., Chicago, Ill.
Laclede-Christy Co., St. Louis, Mo.
Lastik Products Co., Inc., Pittsbrugh, Pa.
Nebel Mfg. Co., Cleveland, O.
Norton Co., Worcester, Mass.
Pecora Paint Co., Inc., Philadelphia, Pa.
Plastic Products Co., Detroit, Mich.
Plibrico Co., Chicago, Ill.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Ramtite Co., The, Chicago, Ill.
Refractory & Insulation Corp., New York, N. Y.
Rutland Fire Clay Co., Rutland, Vt.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Sall Mountain Co., Hamilton, O.
Sauereisen Cements Co., Pittsburgh, Pa.
Smooth-On Mfg. Co., Jersey City, N. J.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Fuel Engineering Co., Detroit, Mich.
Tamms Industries, Inc., Chicago, Ill.
Taylor Sons Co., Charles, Cincinnati, O.
United States Stoneware Co., New York, N. Y.
Utility Laboratory, Inc., Brooklyn, N. Y.
Walsh Refractories Corp., St. Louis, Mo.

CEMENT, INSULATING

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Alton Mineral Wool Insulation Co., St. Louis, Mo.
Armstrong Cork Co., Lancaster, Pa.
Asbestos Asphalt Insulation Co., Chicago, Ill.
Baldwin-Hill Co., Trenton, N. J. (mineral wool)
Bigelow-Liptak Corp., Detroit, Mich.
Bird-Archer Co., Philadelphia, Pa.
Botfield Refractories Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Carney Co., Inc., The, Mankato, Minn.
Chicago Fire Brick Co., Chicago, Ill.
Eagle-Picher Co., Cincinnati, O.
Ephret Magnesia Mfg. Co., Valley Forge, Pa.
Grant Wilson, Inc., Chicago, Ill.
Green Fire Brick Co., Mexico, Mo.
International Vermiculite Co., Girard, Ill.
Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa. (85 per cent magnesia)
Krehbiel Co., J. H., Chicago, Ill. (Asbestos, mineral wool)
Laclede-Christy Co., St. Louis, Mo.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Moore, Inc., Goodloe E., Danville, Ill.
Mundet Cork Corp., North Bergen, N. J.
Munn and Steele, Inc., South Boston, Mass.
National Engineering Products, Inc., Washington, D. C.
National Gypsum Co., Buffalo, N. Y.
Nelson Mfg. Co., B. F., Minneapolis, Minn.
Norristown Magnesia & Asbestos Co., Norristown, Pa.
Pabco Products Inc., San Francisco, Calif.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Peterson Co., B. A., Dowagiac, Mich.
Plibrico Co., Chicago, Ill.
Poe Co., C. W., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Ramtite Co., The, Chicago, Ill.
Refractory & Insulation Corp., New York, N. Y.
Rex Clay Products Co., Detroit, Mich.
Ruberoid Co., New York, N. Y.
Rutland Fire Clay Co., Rutland, Vt.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Sall Mountain Co., Hamilton, O.

Sauereisen Cements Co., Pittsburgh, Pa.
Schundler & Co., Inc., F. E., Long Island City, N. Y.
Smith & Kanzler Corp., Linden, N. J.
Spring Packing Corp., Chicago, Ill.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Fuel Engineering Co., Detroit, Mich.
Union Asbestos & Rubber Co., Chicago, Ill.
United States Mineral Wool Co., Stanhope, N. J.
Walsh Refractories Corp., St. Louis, Mo.
Western Mineral Products Co., Minneapolis, Minn.
Zonolite Co., Chicago, Ill.

CENTRIFUGAL PUMPS

See Pumps, Centrifugal

CHAIN DRIVES

See Drives, Chain

CHAMBERS, COMBUSTION, PREFORMED

Armstrong Cork Co., Lancaster, Pa.
Barclay, Inc., Robert, Chicago, Ill.
Boston Machine Works Co., Lynn, Mass.
Green Fire Brick Co., Mexico, Mo.
Henriksen Co., C. O., Chicago, Ill.
Laclede-Christy Co., St. Louis, Mo.
Monogram Products Co., Inc., Philadelphia, Pa.
Oil Equipment Mfg. Corp., New Haven, Conn.
Peterson Co., B. A., Dowagiac, Mich.
Preferred Utilities Mfg. Corp., New York, N. Y.
Refractory & Insulation Corp., New York, N. Y.
Rex Clay Products Co., Detroit, Mich.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Stuart Supply, Des Moines, Ia.
Walsh Refractories Corp., St. Louis, Mo.

CHAMBERS, TEST, CONTROLLED TEMPERATURE AND HUMIDITY

American Instrument Co., Inc., Silver Spring, Md.
Anetsberger Brothers, Inc., Northbrook, Ill.
Reco Products Div., Recony Corp., New York, N. Y.
Sub-Zero Products Co., Cincinnati, Ohio
Tenney Engineering, Inc., Newark, N. J.
York Corp., York, Pa.

CHANGERS, SPEED, HYDRAULIC COUPLING

American Blower Corp., Detroit, Mich.
CraneVeyor Corp., Los Angeles, Calif.
Link-Belt Co., Philadelphia, Pa.
Reuland Electric Co., Alhambra, Calif. (combined electric motor and fluid drive coupling)

CHANGERS, SPEED, MAGNETIC

Allis Co., Louis, The, Milwaukee, Wis.
Doerr Electric Corp., Cedarburg, Wis.
Electric Machinery Mfg. Co., Minneapolis, Minn.
Reliance Electric & Engineering Co., Cleveland, O.

CHANGERS, SPEED, MECHANICAL

Abart Gear & Machine Co., Chicago, Ill.
Allis Co., Louis, The, Milwaukee, Wis.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Elliott Co., Crocker-Wheeler Div., Ampere, N. J.
DoAll Co., The, Des Plaines, Ill.
Dodge Mfg. Corp., Mishawaka, Ind.
Doerr Electric Corp., Cedarburg, Wis.
Driv-Way Lite Co., Denver, Colo.
Graham Transmissions, Inc., Menomonee Falls, Wis.
Horton Mfg. Co., Inc., Minneapolis, Minn.
Lewellen Mfg. Co., Columbus, Ind.
Lima Electric Motor Co., The, Lima, O.
Link-Belt Co., Philadelphia, Pa.
Lovejoy Flexible Coupling Co., Chicago, Ill.
Master Electric Co., Dayton, O.
Morse Chain Co., Detroit, Mich.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Reeves Pulley Co., Columbus, Ind.
Speed Selector Inc., Cleveland, O.
Standard Transmission Equipment Co., Pasadena, Calif.
Steam Turbine Div., Worthington Pump & Machinery Corp., Wellsville, N. Y.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Sterling Electric Motors, Inc., Los Angeles, Calif.
U. S. Electrical Motors, Inc., Los Angeles, Calif.
Wayne Manufacturing Co., Pomona, Calif.
Worthington Corp., Harrison, N. J.

CHASERS, PIPE AND BOLT

Beaver Pipe Tools, Inc., Warren, O.
Capewell Mfg. Co., Hartford, Conn.
Greenfield Tap & Die Corp., Greenfield, Mass.
Landis Machine Co., Inc., Waynesboro, Pa.
Ridge Tool Co., Elyria, O.
Saunders Mfg. Co., Yonkers, N. Y.
Toledo Pipe Threading Machine Co., Toledo, O.

CHASERS, THREADING DIE

Armstrong Bros. Tool Co., Chicago, Ill.
Beaver Pipe Tools, Inc., Warren, O.
Capewell Mfg. Co., Hartford, Conn.
Greenfield Tap & Die Corp., Greenfield, Mass.
Landis Machine Co., Inc., Waynesboro, Pa.
Ridge Tool Co., Elyria, O.
Saunders Mfg. Co., Yonkers, N. Y.
Toledo Pipe Threading Machine Co., Toledo, O.

CHECK VALVES

See Valves, Check

CHILLERS, WATER, FOR AIR CONDITIONING AND REFRIGERATION

Acme Industries, Inc., Jackson, Mich.
Armstrong Co., Richard M., Westchester, Pa.
Bakeraire Corp., South Windham, Me.
Bell & Gossett Co., Morton Grove, Ill.
Brown Fintube Co., The, Elyria, O.
Brunner Mfg. Co., Utica, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Dahlquist Mfg. Co. Inc., Div. of Process Engineering, Inc., Somerville, Mass.
Davis Engineering Corp., Elizabeth, N. J.
Dole Refrigerating Co., Chicago, Ill.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Drayer-Hanson, Inc., Los Angeles, Calif.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
Frick Co., Waynesboro, Pa.
Graham Mfg. Co., Inc., New York, N. Y.
Griscom-Russell Co., The, Massillon, O.
Halstead & Mitchell, Pittsburgh, Pa.
Heatron, Inc., York, Pa.
Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Howe Ice Machine Co., Chicago, Ill.
Kennard Corp., St. Louis, Mo.
Kewanee-Ross Corp., Kewanee, Ill.
Mayer Refrigerating Engineers, Inc., Rutherford, N. J.
Niagara Blower Co., New York, N. Y.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Reco Products Div., Recony Corp., New York, N. Y.
Refrigeration Economics Co., Inc., Canton, O.
Servel, Inc., Evansville, Ind.
Sims Co., Erie, Pa.
Taco Heaters, Inc., Providence, R. I.
Temprite Products Corp., Birmingham, Mich.
Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
Vilter Mfg. Co., The, Milwaukee, Wis.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Whitlock Mfg. Co., Hartford, Conn.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
Yula Water Heaters, Inc., New York, N. Y.

CHILLERS, WATER, PACKAGED

See Compressors, Refrigerating, Combined with Condenser, Water Chiller, Piping Connections and Controls

CIRCULATORS FOR HOT WATER HEATING SYSTEMS

Alliance Industries, Huntingden Valley, Pa.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Baseline Mfg. Co., Minneapolis, Minn.
Bell & Gossett Co., Morton Grove, Ill.
Columbus Steam Pump Works Co., Columbus, O.
Dayton Electric Mfg. Co., Chicago, Ill.
Dunham Co., C. A., Chicago, Ill.
Economy Pumps Inc., Div. of Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Fostoria Pressed Steel Corp., Magnetic Pump Div., Fostoria, O.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Kainer & Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Kraissl Co., Inc., The, Hackensack, N. J.
Magnaflow Pump Corp., New York, N. Y. (magnetically driven)
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Quality Specialty Co., Inc., Camden, N. J.
Taco Heaters, Inc., Providence, R. I.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, LaCrosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Weil Pump Co., Chicago, Ill.
White Flomatic Corp., Hoosick Falls, N. Y.

CLAMPS, BEAM, PIPE HANGING

Carpenter & Paterson, Inc., East Boston, Mass.
Chicago Nipple Mfg. Co., Cicero, Ill.
Crawford Co., Chicago, Ill.
Farley Sleeve & Hanger Co., Cleveland, O.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Frick Co., Waynesboro, Pa.
Gateway Engineering Co., Chicago, Ill.

Grabler Mfg. Co., Cleveland, O.
Grinnell Co., Providence, R. I.
Hupp Corp., Globe Stamping Div., Cleveland, O.
Leibfried Mfg. Corp., C. H., Brooklyn, N. Y.
Moore, Inc., Goodfoe E., Danville, Ill.
National Valve & Mfg. Co., Pittsburgh, Pa.
Paine Co., Addison, Ill.
Rockwood Sprinkler Co., Worcester, Mass.
Unistrut Products Co., Chicago, Ill.
Walworth Co., New York, N. Y.

CLAMPS, HOSE

Allen Mfg. Co., W. D., Chicago, Ill.
Crane Co., Chicago, Ill.
Everhot Products Co., Chicago, Ill.
Flexible Tubing Corp., Guilford, Conn.
Marman Products Co., Inc., Los Angeles, Calif.
Scovill Mfg. Co., Waterville Div., Waterville, Conn.
Thor Power Tool Co., Aurora, Ill.
Tinnerman Products, Inc., Cleveland, O.

CLAMPS, PIPE REPAIR

Adams Pipe Repair Products, El Monte, Calif.
Chelsea Metal Stamping Co., New York, N. Y.
Chicago Specialty Mfg. Co., Chicago, Ill.
Clow & Sons, James B., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Holoal Mfg. Co., Bellerose, N. Y.
Inner-Tite Div. of Yara Engineering Corp., Elizabeth, N. J.
Jarecki Valve Div., of H. K. Porter Co., Inc., Tulsa, Okla.
Marman Products Co., Inc., Los Angeles, Calif.
Morris Coupling & Clamp Co., Ellwood City, Pa.
Rensselaer Valve Co., Cohoes, N. Y.
Ritter Pattern & Casting Co., Inc., New York, N. Y.
Skinner Co., M. B., South Bend, Ind.
Smooth-On Mfg. Co., Jersey City, N. J.
Yarnall-Waring Co., Philadelphia, Pa.

CLAMPS, PIPE, WELDING

Adjustable Clamp Co., Chicago, Ill.
Albert Pipe Supply Co., Brooklyn, N. Y.
Detroit Stamping Co., Detroit, Mich.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
Jewel Mfg. Co., St. Paul, Minn.
Leibfried Mfg. Corp., C. H., Brooklyn, N. Y.
Trindl Products, Ltd., Chicago, Ill.
Williams & Co., J. H., Buffalo, N. Y.

CLEANERS, AIR, ELECTRICAL

Air-Maze Corp., Cleveland, O.
American Air Filter Co., Inc., Louisville, Ky.
Dollinger Corp., Rochester, N. Y.
Lennox Furnace Co., Marshalltown, Ia.
Radex Corp., Chicago, Ill.
Trion, Inc., McKees Rocks, Pa.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

CLEANERS, PIPE LINE, ELECTRICALLY DRIVEN

Ken-Way Corp., Sparta, Wis.

CLEANERS, TUBE

Airetool Mfg. Co., Springfield, O.
Arcee Products, Pawtucket, R. I. (copper fitting cleaning tool)
Chesterton Co., A. W., Everett, Mass.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Elliott Co., Jeannette, Pa.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Osborn Mfg. Co., Cleveland, O.
Mill-Rose Co., Cleveland, O.
Perfection Grate & Stoker Co., Springfield, Mass.
Pierce Co., Wm. B., The, Buffalo, N. Y.
Pilley Brush Co., Fort Madison, Ia.
Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Spencer Turbine Co., Hartford, Conn.
Wilson, Inc., Thomas C., Long Island City, N. Y.
York Corp., York, Pa.

CLEANERS, VACUUM, FOR BOILERS

Doyle Vacuum Cleaner Co., Grand Rapids, Mich.
Empire Chemical Products Co., Newark, N. J.
Ideal Industries, Inc., Sycamore, Ill.
Lamson Corp., Blower Div., Syracuse, N. Y.
Pullman Vacuum Cleaner Co., Boston, Mass.
Spencer Turbine Co., Hartford, Conn.

CLEANING COMPOUNDS

See Compounds, Cleaning, Pipe Coil and Condenser

CLEANING COMPOUNDS, AIR FILTER

See Compounds, Cleaning, Air Filter

CLEANING MACHINES, PIPE

See Machines, Pipe Cleaning; Cleaners, Pipe Line, Electrically Driven; Rams, Water, for Cleaning Out Pipe Lines

CLOTH, TREATED, FOR DUST COLLECTORS

Menardi & Co., El Segundo, Calif.

COAL BURNERS

See Burners, Pulverized Coal; Stokers

COAL CONVEYORS

See Conveyors, Coal and Ash

COATINGS, PROTECTIVE, FOR METALS

Alrose Chemical Co., Providence, R. I.
Amercoat Corporation, South Gate, Calif.
American Chemical Paint Co., Ambler, Pa. (rust proofing chemicals)
American Hard Rubber Co., New York, N. Y. (hard & soft rubber)
American Solder & Flux Co., Philadelphia, Pa. (Galvanizing powder)
Armstrong Cork Co., Lancaster, Pa. (asphalt for weather & low temperatures)
Barrett Div., Allied Chemical & Dye Corp., New York, N. Y. (Pitchbase)
Bart Mfg. Corp., Belleville, N. J.
Blue Ridge Talc Co., Inc., Henry, Va.
Bonafide Genasco, Inc., New York, N. Y. (asphalt)
Brooklyn Varnish Mfg. Co., Brooklyn, N. Y.
Cabot Inc., Samuel, Boston, Mass. (Bituminous black paint)
Calbar Paint & Varnish Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O. (Asphalt and aluminum paints)
Chemical & Metallurgical Products, Inc., New York, N. Y. (zinc powder, Galvanic Corrosion, resistant, resealing)
Colonial Alloys Co., Metals Div., Philadelphia, Pa. (anodizing chemical oxidizing for aluminum)
Condenser Service & Engineering Co., Inc., Hoboken, N. J. (Metal spray)
Cordo Chemical Co., Norwalk, Conn.
Corrosite Div., Reliance Paint Co., Brooklyn, N. Y. (vinyl plastic)
Dampney Co., The, Boston, Mass.
Dearborn Chemical Co., Chicago, Ill. (Rust preventive)
Debevoise Co., The, Brooklyn, N. Y.
Dow Corning Corp., Midland, Mich.
du Pont de Nemours & Co. (Inc.), E. I., Fabrics & Finishes Dept., Wilmington, Del.
Eagle-Picher Co., Cincinnati, O. (Waterproof insulating, red lead and blue lead)
Elraco Engineering Co., Los Angeles, Calif. (interior tank paint)
Flintkote Co., The, New York, N. Y. (Asphalt emulsions)
Flexrock Co., Philadelphia, Pa.
Foster Co., Benjamin, Philadelphia, Pa.
Galv-Weld Products, Lima, O. (Regalvanizing)
Gates Engineering Co., Wilmington, Del.
Goodrich Co., B. F., Akron, O.
Haering & Co., Inc., D. W., San Antonio, Texas. (Drying and non-drying)
Hague & Co., Alfred, Brooklyn, N. Y.
Harco Corp., Cleveland, O. (corrosion protection for underground piping, process tanks, storage tanks, and radiant heating piping)
Hardy, Inc., Charles, New York, N. Y. (18-8 stainless steel paste)
Heresite & Chemical Co., Manitowoc, Wis. (Synthetic)
Hill, Hubbell & Co., Cleveland, O. (coating and wrap for pipe)
Horn Co., Inc., A. C., Long Island City, N. Y.
Houghton & Co., E. F., Philadelphia, Pa.
Industrial Metal Protectives, Inc., Dayton, O.
Insul-Mastic Corp., Pittsburgh, Pa. (asphaltic & plastic)
Interchemical Corp., Finishes Div., Newark, N. J.
Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Kellogg Co., M. W., The, New York, N. Y. (Heat resisting)
Knight, Maurice A., Akron, O. (Vinyl plastic base)
Koppers Co., Inc., Pittsburgh, Pa. (coal tar)
Lastik Products Co., Inc., Pittsburgh, Pa.
Lithcote Corp., Chicago, Ill.
Maas & Waldstein Co., Newark, N. J.
Markal Co., Chicago, Ill.
Master Mechanics Co., Cleveland, O.
Midland Paint & Varnish Co., Cleveland, O.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Minnesota Mining & Mfg. Co., Adhesives & Coatings Div., Detroit, Mich. (Sound dampening and insulating types as well as for protection against corrosion)
Miracle Adhesives, Corp., New York, N. Y.
Mortell Co., J. W., Kankakee, Ill. (Asphalt)
Mundet Cork Corp., North Bergen, N. J. (plastic waterproof paint)
National Lead Co., New York, N. Y. (Red lead)
National Pipe Coatings, Inc., Huntington Park, Calif.
Nebel Mfg. Co., Cleveland, O.
Nelson Mfg. Co., B. F., Minneapolis, Minn.
Oakite Products, Inc., New York, N. Y.
Octagon Process, Inc., Staten Island, N. Y. (rust preventive oils, rust-proofing compounds)
Ohmlac Paint & Refining Co., Inc., New York, N. Y. (Acid resistant, heat resistant)
Penn Galvanizing Co., Philadelphia, Pa. (Galvanizing)
Pennsylvania Salt Mfg. Co., Philadelphia, Pa. (chlorinated hydrocarbon base, and liquid neoprene base)
Perolin Co., Inc., Chicago, Ill.
Pittsburgh Plate Glass Co., Pittsburgh, Pa. (Paint, varnish, lacquer)
Poe Co., C. W., The, Cleveland, O.
Porce-Lin Tank Lining Co., Detroit, Mich. (plastic & ceramic)
Presstite Engineering Co., St. Louis, Mo.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Reilly Tar & Chemical Corp., Indianapolis, Ind. (Coal tar base)
Ric-wiL Co., The, Barberton, O. (phenolic resin)

Robertson Co., H. H., Pittsburgh, Pa.
Rubber & Plastics Compound Co., New York, N. Y. (anticorrosive coating)
Rust-Oleum Corp., Evanston, Ill.
Saran Lined Pipe Co., Ferndale, Mich.
Saverite Engineering Co., Hoboken, N. J. (Tank coatings, rust preventive)
Schror, Dr. Adolph, East Orange, N. J.
Sherwin-Williams Co., The, Cleveland, O.
Sonneborn Sons, Inc., L., New York, N. Y.
Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga. (Metallic paint)
Special Chemicals Corp., New York, N. Y. (Aluminum paint)
Steelcote Mfg. Co., St. Louis, Mo.
Stewart-Warner Corp., Heating Div., Indianapolis, Ind. (ceramic)
Tapecoat Co., The, Evanston, Ill. (coal tar protective coating in tape form for pipe and fittings)
Thompson and Co., Oakmont, Pa.
Tropical Paint & Oil Co., Cleveland, O.
Turco Products, Inc., Los Angeles, Calif.
United Chromium, Inc., New York, N. Y. (Chemical resisting organic coatings)
United States Stoneware Co., New York, N. Y. (Corrosion resistant)
Watson-Standard Co., Pittsburgh, Pa.
Wilbur & Williams Co., Brighton, Mass.
Wilhelm Co., A., Reading, Pa.
Wolfe-Kote Co., Inc., Sheboygan, Wis.
X-Pando Corp., Long Island City, N. Y. (Anti-corrosive)

COCKS, BOILER GAGE

Bordo Co., Inc., L. J., Glenside, Pa.
Crane Co., Chicago, Ill.
Detroit Brass & Malleable Works, Detroit, Mich.
Ernst Water Column & Gauge Co., Livingston, N. J.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Keckley Co., O. C., Chicago, Ill.
Lonergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marsh Heating Equipment Co., Skokie, Ill.
Nason Co., Clarkston, Mich.
Penberthy Injector Co., Detroit, Mich.
Powell Co., Wm., The, Cincinnati, O.
Reliance Gauge Column Co., Cleveland, O.
Strahman Valves, Inc., New York, N. Y.
Swift Lubricator Co., The, Elmira, N. Y.
Williams Gauge Co., The, Pittsburgh, Pa.
Wright-Austin Co., Detroit, Mich.

COILS

See Surface, Cooling; Surface, Heating

COILS, CONDENSATION

American District Steam Co., Inc., North Tonawanda, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
General Fittings Co., Providence, R. I.
Heatron, Inc., York, Pa.
Lewis & Co., Joseph E., Baltimore, Md.
Parker Appliance Co., The, Cleveland, O.
Trane Co., The, La Crosse, Wis.
Vilter Mfg. Co., The, Milwaukee, Wis.
Yula Water Heaters, Inc., New York, N. Y.

COILS, FOR HOT WATER STORAGE TANKS

Adams Co., The, Dubuque, Ia.
Alstrom Corp., Bronx, N. Y.
American Cooling Tower Co., Kansas City, Mo.
American District Steam Co., Inc., North Tonawanda, N. Y.
Bell & Gossett Co., Morton Grove, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davis Engineering Corp., Elizabeth, N. J.
Downingtown Iron Works, Downingtown, Pa.
Everhot Products Co., Chicago, Ill.
General Fittings Co., Providence, R. I.
General Heaters & Regulators Co., East Chicago, Ind.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Kewanee-Ross Corp., Kewanee, Ill.
Lindy Heaters, Inc., New York, N. Y.
Manning & Lewis Engineering Co., Newark, N. J.
National Pipe Bending Co., New Haven, Conn.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Pittsburgh Nipple Wks., Inc., Pittsburgh, Pa.
Pittsburgh Pipe Coil & Bending Co., Etna, Pa.
Quaker City Iron Wks., Philadelphia, Pa.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Sims Co., Erie, Pa.
Taco Heaters, Inc., Providence, R. I.
Tranter Mfg., Inc., Lansing, Mich.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Whitlock Mfg. Co., Hartford, Conn.
Yula Water Heaters, Inc., New York, N. Y.

COILS AND PANELS, RADIANT HEATING AND COOLING, PREFABRICATED

Alstrom Corp., Bronx, N. Y.
American Brass Co., Waterbury, Conn.
Atlantic Pipe Bending and Fabricating Corp., Wood-Ridge, N. J.
Burgess-Manning Co., Chicago, Ill. (also for radiant cooling)
Capitol Mfg. & Supply Co., Columbus, O.
Carlon Products Corp., Cleveland, O. (headers)
Clow & Sons, James B., Chicago, Ill.
Cobra Pipe & Coil Co., Inc., Elmwood, Conn.
Crittall Radiant Heating, Inc., Richard, New York, N. Y.
Even-Ray Co., Inc., Newark, N. J.
Fricke, Fred J., Albuquerque, N. M.
Hi-Flow Products, Inc., Lindenhurst, N. Y.
Kritzer Radiant Coils, Inc., Chicago, Ill.
Marlo Coil Co., St. Louis, Mo.
Meco, Inc., Portland, Ore.
National Pipe Bending Co., New Haven, Conn.
Pan-L-Heat Corp., Portland, Ore.
Radiant Heat Engineering, Inc., Pasadena, Calif.
Radiant Panel Mfg. Co., Torrington, Conn.
Simplex Ceiling Corp., New York, N. Y.
T & H Engineering Co., Little Ferry, N. J. (hammer and holding rig for installing ceiling heating coils)
Thermapanels, Inc., Santa Clara, Calif.

COILS, PIPE

Acme Industries, Inc., Jackson, Mich.
Albert Pipe & Supply Co., Brooklyn, N. Y.
American Cooling Towers Co., Kansas City, Mo.
Atlantic Pipe Bending and Fabricating Corp., Wood-Ridge, N. J.
B & M Mfg. Co., East Orange, N. J.
Bakeraire Corp., South Windham, Me.
Capitol Mfg. & Supply Co., Columbus, O.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Nipple Mfg. Co., Cicero, Ill.
Clow & Sons, James B., Chicago, Ill.
Cobra Pipe & Coil Co., Inc., Elmwood, Conn.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Corning Glass Works, Corning, N. Y.
Crane Co., Chicago, Ill.
Davis Engineering Corp., Elizabeth, N. J.
Division Lead Co., Summit, Ill.
Edwards Engineering Corp., Pompton Plains, N. J.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y. (lead, lead covered, and lead alloy)
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
Flori Pipe Co., The, St. Louis, Mo.
Frick Co., Waynesboro, Pa.
Grinnell Co., Inc., Providence, R. I.
Harris & Co., Arthur, Chicago, Ill.
Heil Process Equipment Corp., Cleveland, O. (Impervious Graphite)
Howe Ice Machine Co., Chicago, Ill.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Lewis & Co., Joseph E., Baltimore, Md.
Lumsden & Van Stone, Div. of Midwest Piping & Supply Co., South Boston, Mass.
Marlo Coil Co., St. Louis, Mo.
Marquette Coppersmithing Co., Philadelphia, Pa.
Midwest Piping Co., Inc., St. Louis, Mo.
Mitchell & Co., Inc., W. K., Philadelphia, Pa.
Mueller Brass Co., Port Huron, Mich.
National Pipe Bending Co., New Haven, Conn.
Ohio Pipe Bending & Machine Co., Cleveland, O.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Pittsburgh Pipe Coil & Bending Co., Etna, Pa.
Radiant Heat Engineering, Inc., Pasadena, Calif.
Reco Products Div., Recony Corp., New York, N. Y.
Refrigeration Appliances, Inc., Chicago, Ill.
Rempe Co., Chicago, Ill.
Reynolds Mfg. Co., Inc., Springfield, Mo.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Sawhill Mfg. Co., Sharon, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Shaw-Kendall Engineering Co., Toledo, O.
Tranter Mfg., Inc., Lansing, Mich.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vilter Mfg. Co., The, Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Wallace Supplies Mfg. Co., Chicago, Ill.
Western Piping & Engineering Co., Inc., San Francisco, Calif.
Whitlock Mfg. Co., Hartford, Conn.
York Corp., York, Pa.

COLLECTION, DUST AND FUME, ULTRASONIC

Ultrasonic Corp., Cambridge, Mass.

COLLECTORS, DUST

Aerotec Corp., The, Greenwich, Conn.
Aget-Detroit Co., Ann Arbor, Mich.
Allington & Curtis Mfg. Co., Saginaw, Mich. (centrifugal & bag)
American Air Filter Co., Inc., Louisville, Ky.
American Blow Pipe Co., Chicago, Ill.
American Blower Corp., Detroit, Mich.
American Wheelabrator & Equipment Corp., Mishawaka, Ind. (cloth-tube type)
Banister Co., Inc., A. W., Cambridge, Mass.
Blower Application Co., Milwaukee, Wis.
Bubar Dust Systems, Inc., Old Lyme, Conn. (mechanical)

Buffalo Forge Co., Buffalo, N. Y. (wet & dry)
Carolina Blower Co., Inc., Greensboro, N. C.
Centri-Spray Corp., Detroit, Mich. (Wet type)
Chicago Blower Corp., Franklin Park, Ill. (centrifugal)
Cincinnati Electrical Tool Co., The, Cincinnati, O. (self contained
Clark Dust Control Co., Chicago, Ill.
Columbian Steel Tank Co., Kansas City, Mo.
Day Co., The, Minneapolis, Minn.
Diamond Power Specialty Corp., Lancaster, O.
DoAll Co., The, Des Plaines, Ill.
Ducon Co., The, Mineola, N. Y. (Cyclone, centrifugal wash, and bag type)
Dust Filter Co., Chicago, Ill.
Dust Suppression & Engineering Co., Lake Orion, Mich.
Dustex Corp., Buffalo, N. Y. (mechanical)
Farr Co., Los Angeles, Calif. (cyclonic)
Ft. Worth Steel & Machinery Co., Ft. Worth, Tex.
Goethel Sheet Metal Wks., Alfred, Milwaukee, Wis.
Green Fuel Economizer Co., Beacon, N. Y. (dry type)
Griffin & Co., Inc., Louisville, Ky.
Indiana Fan Company, Indianapolis, Ind.
Jacobs Co., Inc., B. & J., Cincinnati, O.
Kirk & Blum Mfg. Co., Cincinnati, O.
Kluegel & Co., E., St. Paul, Minn.
Koppers Co., Inc., Metal Products Div., Baltimore, Md. (electrostatic)
Lamson Corp., Blower Div., Syracuse, N. Y.
Lumm Co., A. H., Toledo, O.
Mahon Co., R. C., The, Detroit, Mich. (dry inertia, air washers, fog filters)
Johnson March, Philadelphia, Pa.
Newcomb-Detroit Co., Detroit, Mich. (recirculating water type)
Northern Blower Co., Cleveland, O.
Omega Machine Co., Div. of Builders Iron Foundry, Providence, R. I. (bag type)
Pangborn Corp., Hagerstown, Md. (cloth filter)
Peters-Dalton, Inc., Detroit, Mich.
Prat-Daniel Corp., East Port Chester, Conn.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
Research Corp., New York, N. Y.
Ruemelin Mfg. Co., Milwaukee, Wis.
St. Louis Blow Pipe & Heater Co., Div. of Young Sales Corp., St. Louis, Mo.
Schmieg Industries, Detroit, Mich.
Schneible Co., Claude B., Detroit, Mich.
Sly Mfg. Co., W. W., Cleveland, O.
Spencer Turbine Co., Hartford, Conn.
Sprout-Waldron & Co., Muncy, Pa.
Torit Mfg. Co., St. Paul, Minn. (cloth filter and centrifugal separator)
Wagner Awning & Mfg. Co., Cleveland, O. (Dust recovery bags)
Western Blower Co., Seattle, Wash.
Western Precipitation Corp., Los Angeles, Calif.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.
Young & Bertke Co., Cincinnati, O.

COLORIMETERS

American Instrument Co., Inc., Silver Spring, Md.
Bausch & Lomb Optical Co., Rochester 2, N. Y.
Daigger & Co., A., Chicago, Ill.
Elgin-Refinite, Div. of Elgin Softener Corp., Elgin, Ill.
Ellison Draft Gage Co., Chicago, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Photovolt Corp., New York, N. Y.
Will Corp., Rochester, N .Y.

COMBUSTION CHAMBERS

See Chambers, Combustion, Preformed

COMBUSTION CONTROL

See Controls, Draft, Barometric; Regulators, Draft, Combustion; Systems, Combustion Control

COMBUSTION RECORDERS

See Recorders, Carbon Dioxide

COMBUSTION TESTING KITS

See Kits, Combustion Testing; Analyzers, Carbon Dioxide, Portable; Testers, Smoke

COMPOUNDS, AIR FRESHENING

Air-Aid Corp., Boston, Mass.
Aireactor Corp., New York, N. Y.
Airkem, Inc., New York, N. Y.
Ampion Corp., Long Island City, N. Y.
Carbide and Carbon Chemicals Co., A Division of Union Carbide and Carbon Corp., New York, N. Y.
Lord & Clark Co., Inc., Boston, Mass.

COMPOUNDS, ANTI-FREEZE, FOR SNOW MELTING COILS

Socony-Vacuum Oil Co., Inc., New York, N. Y.
Solvay Process Div., Allied Chemical & Dye Corp., New York, N. Y.

COMPOUNDS, BOILER CLEANING

Agava Products, Inc., Jersey City, N. J.
Agnew & Tomlinson, Long Island City, N. Y.
American Chemical Paint Co., Ambler, Pa.
American K. A. T. Corp., Garwood, N. J.
American Sand-Banum Co., Inc., New York, N. Y.
Anderson-Stolz Corp., Kansas City, Mo.
Aquatrol Laboratories, Inc., Clifton, N. J.
Bird-Archer Co., Philadelphia, Pa.
Black & White Chemical Co., New York, N. Y.
Blue Seal Chemical Co., Roselle Park, N. J.
Cannon Chemical Co., Inc., Cambridge, Mass.
Chemical Engineering Co., Dallas, Tex.
Chemical Solvent Co., Birmingham, Ala.
Continental Products Co., Euclid, O.
Dearborn Chemical Co., Chicago, Ill.
Diamond Chemical Products, New York, N. Y.
Dowell Inc., Tulsa, Okla.
Elraco Engineering Co., Los Angeles, Calif.
Ferro-Nil Corp., New York, N. Y.
Grief, Edward C., Bogota, N. J.
Haering & Co., Inc., D. W., San Antonio, Tex.
Hagan Corp., Pittsburgh, Pa.
Hercules Chemical Co., Inc., New York, N. Y.
Hood Refining Co., Greensburg, Pa.
Houghton & Co., E. F., Philadelphia, Pa.
Kenite Laboratory, Inc., Madison, N. J.
Kewanee-Ross Corp., Kewanee, Ill.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Krehbiel Co., J. H., Chicago, Ill.
MacDermid Chemical Co., Bristol, Conn.
Madden Corp., The, Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Moreheat Distribution, Inc., Cincinnati, O.
North American Fibre Products Co., The, Cleveland, O.
O'Brien Industries, Caldwell, N. J.
Octagon Process, Inc., Staten Island, N. Y.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
Permutit Co., New York, N. Y.
Perolin Co., Inc., Chicago, Ill.
Radiator Specialty Co., Charlotte, N. C.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Saverite Engineering Co., Hoboken, N. J.
Schror, Dr. Adolph, East Orange, N. J.
Solvay Process Div., Allied Chemical & Dye Corp., New York, N. Y.
Squires Co., C. E., The, Cleveland, O.
Strong, Carlisle & Hammond Co., Cleveland, O.
Sulflo, Inc., Elizabeth, N. J.
Turco Products, Inc., Los Angeles, Calif.
Utility Laboratory, Inc., Brooklyn, N. Y.
Vinco Co., Inc., The, New York, N. Y.
Warren Refining & Chemical Co., The, Cleveland, O.
Water Control Engineering Co., Kansas City, Mo.
Water Service Laboratories, Inc., New York, N. Y.
Water Treatment Co. of America, Pittsburgh, Pa.
Western Chemical Co., Kansas City, Mo.
X Laboratories, Inc., New York, N. Y.

COMPOUNDS, BOILER AND RADIATOR SEALING

Ampion Corp., Long Island City, N. Y.
Arco Co., The, Cleveland, O.
Atlas Chemical Co., Marietta, O.
Black & White Chemical Co., New York, N. Y.
Blue Seal Chemical Co., Roselle Park, N. J.
Cannon Chemical Co., Inc., Cambridge, Mass.
Chemical Solvent Co., Birmingham, Ala.
Chicago Specialty Mfg. Co., Chicago, Ill.
Desolvo Co., The, Pittsburgh, Pa.
Diamond Chemical Products, New York, N. Y.
Hampton-Cross Co., The, Louisville, Ky.
Hercules Chemical Co., Inc., New York, N. Y.
Kenite Laboratory, Inc., Madison, N. J.
Krehbiel Co., J. H., Chicago, Ill.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
National Engineering Products, Inc., Washington, D. C.
Quigley Co., Inc., New York, N. Y.
Radiator Specialty Co., Charlotte, N. C.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Sulflo, Inc., Elizabeth, N. J.
Utility Laboratory, Inc., Brooklyn, N. Y.
Vinco Co., Inc., The, New York, N. Y.
X Laboratories, Inc., New York, N. Y.

COMPOUNDS, CLEANING, AIR FILTER

Carbide and Carbon Chemicals Div., United Carbide and Carbon Corp. New York, N. Y.
Dollinger Corp., Rochester, N. Y.
National Aniline Div., Allied Chemical & Dye Corp., New York, N. Y.
Oakite Products, Inc., New York, N. Y.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
Turco Products, Inc., Los Angeles, Calif.

COMPOUNDS, CLEANING, PIPE COIL AND CONDENSER

American Chemical Paint Co., Ambler, Pa.
Anderson-Stolz Corp., Kansas City, Mo.
Apex All Weather Products, Chicago, Ill.
Aquatrol Laboratories, Inc., Clifton, N. J.
Bird-Archer Co., Philadelphia, Pa.
Blue Seal Chemical Co., Roselle Park, N. J.
Cannon Chemical Co., Inc., Cambridge, Mass.

Carolina Aniline & Extract Co., Inc., Charlotte, N. C.
Chemical Engineering Co., Dallas, Tex.
Chemical Solvent Co., Birmingham, Ala.
Dearborn Chemical Co., Chicago, Ill.
Dowell, Inc., Tulsa, Okla.
Elraco Engineering Co., Los Angeles, Calif.
Haering & Co., Inc., D. W., San Antonio, Tex.
Hercules Chemicals Co., Inc., New York, N. Y.
MacDermid Chemical Co., Bristol, Conn.
Madden Corp., The, Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
National Aniline Div., Allied Chemical & Dye Corp., New York, N. Y.
North American Fibre Products Co., The, Cleveland, O.
Oakite Products, Inc., New York, N. Y.
Octagon Process, Inc., Staten Island, N. Y.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
Perolin Co., Inc., Chicago, Ill.
Radiator Specialty Co., Charlotte, N. C.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Turco Products, Inc., Los Angeles, Calif.
Water Control Engineering Co., Kansas City, Mo.
Water Treatment Co., of America, Pittsburgh, Pa.
Western Chemical Co., Kansas City, Mo.

COMPOUNDS, WELDING

Acme White Lead & Color Wks., Detroit, Mich.
Allen Co., Inc., L. B., Chicago, Ill.
Allied Weld-Craft, Inc., Indianapolis, Ind.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Aluminum Co. of America, Pittsburgh, Pa.
American Solder & Flux Co., Philadelphia, Pa.
Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Marquette Mfg. Co., Minneapolis, Minn.
Metal & Thermit Corp., New York, N. Y.
Midland Paint & Varnish Co., Cleveland, O.
Mir-O-Col Alloy Co., Inc., Los Angeles, Calif.
Modern Engineering Co., St. Louis, Mo.
Powder Weld Process Co., The, Brooklyn, N. Y. (Powdered)
Presstite Engineering Co., St. Louis, Mo.
Sight Feed Generator Co., West Alexandria, O.
Solar Aircraft Co., San Diego, Calif.
Special Chemicals Corp., New York, N. Y.
Thompson and Co., Oakmont, Pa.
Turco Products, Inc., Los Angeles, Calif.
Victor Equipment Co., Welding Equipment Div., San Francisco, Calif.
Wolfe-Kote Co., Inc., Sheboygan, Wis.

COMPRESSED AIR DEHUMIDIFIERS

See Dehumidifiers for Compressed Air

COMPRESSED AIR MOTORS

See Motors, Compressed Air Powered

COMPRESSOR BASES

See Bases and Pads, Vibration Isolating

COMPRESSOR PARTS

See Parts, Compressor

COMPRESSOR SEALS

See Seals, Terminal, for Compressors

COMPRESSORS, AIR

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Beach-Russ Co., New York, N. Y.
Binks Mfg. Co., Chicago, Ill.
Brunner Mfg. Co., Utica, N. Y.
Bury Compressor Co., Erie, Pa.
Chicago Pneumatic Tool Co., New York, N. Y.
Clark Bros. Co., Inc., Div. of Dresser Industries, Olean, N. Y.
Cleaver-Brooks Co., Milwaukee, Wis.
Cooper-Bessemer Corp., Mt. Vernon, O.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Davey Compressor Co., Kent, O.
Dayton Air Compressor Co., The, Dayton, O.
DeVilbiss Co., The, Toledo, O.
Electric Sprayit Co., The, Sheboygan, Wis.
Essick Mfg. Co., Los Angeles, Calif.
Fuller Co., Catasaqua, Pa.
Gardner-Denver Co., Quincy, Ill.
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Gray Co., Inc., Minneapolis, Minn.
Ingersoll-Rand Co., New York, N. Y.
Johnson Service Co., Milwaukee, Wis.
Joy Mfg. Co., Pittsburgh, Pa.
Lammert & Mann Co., Chicago, Ill.
Lamson Corp., Blower Div., Syracuse, N. Y.
Lynch Corp., Anderson, Ind.
M & E Mfg. Co., Indianapolis, Ind.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Nash Engineering Co., South Norwalk, Conn.
North Penn Co., New York, N. Y.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Roots-Connersville Blower Div., Connersville, Ind.
Schramm, Inc., West Chester, Pa.
Spencer Turbine Co., Hartford, Conn.
Union Steam Pump Co., Battle Creek, Mich.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Wayne Pump Co., Fort Wayne, Ind.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wilson Co., K. R., Buffalo, N. Y.
Worthington Corp., Harrison, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

COMPRESSORS, REFRIGERATING, CENTRIFUGAL

Carrier Corp., Syracuse, N. Y. (Carrene)
Lipman Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Trane Co., The, LaCrosse, Wis.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
York Corp., York, Pa.

COMPRESSORS, REFRIGERATING, COMBINED WITH CONDENSER, WATER CHILLER, PIPING CONNECTIONS, AND CONTROLS

Acme Industries, Inc., Jackson, Mich.
Brown Products Co., Forest Hills, N. Y.
Brunner Mfg. Co., Utica, N. Y.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Diceler Div. of General Machine & Mfg. Co., Berwick, Pa.
Drayer-Hanson, Inc., Los Angeles, Calif.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
Frick Co., Waynesboro, Pa.
Lehigh Mfg. Co., Div. of Lehigh Foundries, Inc., Lancaster, Pa.
Refrigeration Economics Co., Inc., Canton, O.
Schnacke, Inc., Evansville, Ind.
Tecumseh Products Co., Tecumseh, Mich.
Temprite Products Corp., Dept. HPAC, Birmingham, Mich.
Trane Co., The, La Crosse, Wis.
Typhoon Air Conditioning Co., Inc., Brookyn, N. Y.
Vilter Mfg. Co., The, Milwaukee, Wis.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
York Corp., York, Pa.

COMPRESSORS, REFRIGERATING, RECIPROCATING

Bakeraire Corp., South Windham, Me. ("Freon," Methyl chloride, Ammonia)
Blissfield Mfg. Co., Blissfield, Mich.
Brunner Mfg. Co., Utica, N. Y. (Methyl chloride, "Freon," sulphur dioxide)
Carrier Corp., Syracuse, N. Y. ("Freon")
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O. (Radial)
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Copeland Refrigeration Corp., Sidney, O.
Curtis Refrigeration Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Diceler Div. of General Machine & Mfg. Co., Berwick, Pa.
Frick Co., Waynesboro, Pa. (Ammonia, "Freon")
Frigidaire Div., General Motors Corp., Dayton, O.
General Machinery Co., Spokane, Wash.
Ingersoll-Rand Co., New York, N. Y.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Lehigh Mfg. Co., Div. of Lehigh Foundries, Inc., Lancaster, Pa.
Lipman Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Ready-Power Co., The, Detroit, Mich. (radial unit driven by direct-connected internal combustion engine)
Reliance Refrigerating Machine Co., Chicago, Ill. ("Freon," methyl chloride, ammonia)
Reynolds Mfg. Co., Inc., Springfield, Mo.
Schnacke, Inc., Evansville, Ind.
Servel, Inc., Evansville, Ind.
Stewart Ice Machine Co., Pomona, Calif.
Tecumseh Products Co., Tecumseh, Mich.
Trane Co., The, LaCrosse, Wis.
Vilter Mfg. Co., Milwaukee, Wis. ("Freon" ammonia)
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
York Corp., York, Pa. (Carbon dioxide, ammonia, "Freon")

COMPRESSORS, REFRIGERATING, STEAM JET

Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engrg. Co., Inc., New York, N. Y.
Economy Pumps Inc., Div. of Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Graham Mfg. Co., Inc., New York, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Kewanee-Ross Corp., Kewanee, Ill.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.

COMPRESSORS, STEAM BOOSTER

Bury Compressor Co., Erie, Pa.
Graham Mfg. Co., Inc., New York, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Joy Mfg. Co., Pittsburgh, Pa.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Worthington Corp., Harrison, N. J.

CONCRETE, INSULATING, FOR UNDERGROUND PIPING

Munn and Steele, Inc., South Boston, Mass.
Zonolite Co., Chicago, Ill.

CONDENSATE DISPOSAL UNITS

See Pumps, Condensate, For Removing Condensation From Air Conditioning Units

CONDENSATE RETURN

See Pumps, Condensation Return; Systems, Condensate Return

CONDENSATION METERS

See Meters, Condensation

CONDENSATION PUMPS

See Pumps, Condensation

CONDENSER TUBES

See Tubes, Condenser

CONDENSERS, REFRIGERATING, AIR COOLED

Blazer, M. & Son, Passaic, N. J. (to 50 tons)
Bush Mfg. Co., West Hartford, Conn. (1/6 hp to 3 hp)
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Drayer-Hanson, Inc., Los Angeles, Calif. (1 to 10 tons)
Fedders-Quigan Corp., Buffalo, N. Y.
Heat-X-Changer Co., The, Brewster, N. Y. (1/3 hp to 5 hp)
Hooper Engineering Co., Liberty Center, O.
Kramer Trenton Co., Trenton, N. J.
Marlo Coil Co., St. Louis, Mo. (1 to 20 tons)
McCord Corp., Detroit, Mich. (to 3 HP)
Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill. (2 to 10 tons)
Rittling Corp., The, Buffalo, N. Y. (up to 7½ hp)
Rome-Turney Radiator Co., Rome, N. Y.
Vilter Mfg. Co., The, Milwaukee, Wis.

CONDENSERS, REFRIGERATING, EVAPORATIVE

Acme Industries, Inc., Jackson, Mich.
American Blower Corp., Detroit, Mich.
American Cooling Tower Co., Kansas City, Mo.
Bakeraire Corp., South Windham, Me.
Baltimore Aircoil Co., Inc., Baltimore, Md.
Blazer, M. & Son, Passaic, N. J.
Buffalo Forge Co., Buffalo, N. Y.
Bush Mfg. Co., West Hartford, Conn.
Carrier Corp., Syracuse, N. Y. ("Freon," ammonia)
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Crowell & Dunn, Inc., New York, N. Y.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo
Drayer-Hanson, Inc., Los Angeles, Calif.
Frick Co., Waynesboro, Pa.
Frigidaire Div., General Motors Corp., Dayton, O.
G & O Mfg. Co., New Haven, Conn.
Governair Corp., Oklahoma City, Okla.
Harry Cooling Towers, Inc., New York, N. Y.
Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Marlo Coil Co., St. Louis, Mo.
McIntyre Engineering Co., Inc., South San Francisco, Calif.
McQuay, Inc., Minneapolis, Minn.
Niagara Blower Co., New York, N. Y.
Reco Products Div., Recony Corp., New York, N. Y.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Servel, Inc., Electric Refrigeration Div., Evansville, Ind.
Silco Products, Inc., Minneapolis, Minn.
Super-Cold Corp., Los Angeles, Calif.
Tenney Engineering, Inc., Newark, N. J.
Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
Union Asbestos & Rubber Co., Chicago, Ill.
United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.

CONDENSERS, REFRIGERATING, SHELL AND COIL

Acme Industries, Inc., Jackson, Mich.
Armstrong Co., Richard M., Westchester, Pa.
Autorad Inc., Chicago, Ill.
Bakeraire Corp., South Windham, Me.
Brown Fintube Co., The, Elyria, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Davis Engineering Corp., Elizabeth, N. J.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
General Fittings Co., Providence, R. I.
Halstead & Mitchell, Pittsburgh, Pa. (Double tube)
Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Heatron, Inc., York, Pa.
Heil Process Equipment Corp., Cleveland, O.
Howe Ice Machine Co., Chicago, Ill.
Lehigh Mfg. Co., Div. of Lehigh Foundries, Inc., Lancaster, Pa
Nooter Corp., St. Louis, Mo.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Reco Products Div., Recony Corp., New York, N. Y.
Refrigeration Economics Co., Inc., Canton, O.
Rome-Turney Radiator Co., Rome, N. Y.
Super-Cold Corp., Los Angeles, Calif.
Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
Union Asbestos & Rubber Co., Chicago, Ill.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Whitlock Mfg. Co., Hartford, Conn.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.
Yula Water Heaters, Inc., New York, N. Y.

CONDENSERS, REFRIGERATING, SHELL AND TUBE

Acme Industries, Inc., Jackson, Mich.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Andale Co., Philadelphia, Pa.
Autorad Inc., Chicago, Ill.
Armstrong Co., Richard M., Westchester, Pa.
Bakeraire Corp., South Windham, Me.
Bell & Gossett Co., Morton Grove, Ill.
Biggs Boiler Works Co., E., Akron, O.
Brown Fintube Co., The, Elyria, O.
Carrier Corp., Syracuse, N. Y. (Carrene)
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Davis Engineering Corp., Elizabeth, N. J.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Frick Co., Waynesboro, Pa.
General Heaters & Regulators Co., East Chicago, Ind.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Howe Ice Machine Co., Chicago, Ill.
Kewanee-Ross Corp., Kewanee, Ill.
Manning & Lewis Engineering Co., Newark, N. J.
National Radiator Co., The, Johnstown, Pa.
Nooter Corp., St. Louis, Mo.
Ohio Pipe Bending & Machine Co., Cleveland, O.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Reco Products Div., Recony Corp., New York, N. Y.
Refrigeration Economics Co., Inc., Canton, O.
Reliance Refrigerating Machine Co., Chicago, Ill.
Reynolds Mfg. Co., Inc., Springfield, Mo.
Roessing Mfg. Co., Pittsburgh, Pa.
Rome-Turney Radiator Co., Rome, N. Y.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Standard Refrigeration Co., Chicago, Ill.
Stewart Ice Machine Co., Pomona, Calif.
Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
Union Asbestos & Rubber Co., Chicago, Ill.
Union Steam Pump Co., Battle Creek, Mich.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Whitlock Mfg. Co., Hartford, Conn.
Wittenmeier Machinery Co., Chicago, Ill.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.
Yula Water Heaters, Inc., New York, N. Y.

CONDENSERS, WATER DISTRIBUTORS FOR

See Distributors, Water, for Condensers

CONDENSING UNITS

See Compressors

CONDUCTORS AND PANELS, ELECTRICAL, FOR RADIANT HEATING

Berko Electric Co., Queens Village, N. Y.
Continental Radiant Glass Heating Corp., New York, N. Y.
Electradiant Corp., Monterey, Calif.
Electriglas Corp., Bergenfield, N. J. (electric glass panels)
Electrofilm Inc., North Hollywood, Calif.
Electromode Corp., Rochester, N. Y.
Roberson Co., L. N., Seattle, Wash.
ThermoRay Corp., New York, N. Y.
United States Rubber Co., New York, N. Y.
Wiegand Co., Edwin L., Pittsburgh, Pa.

CONDUIT, UNDERGROUND PIPING

Byers Co., A. M., Pittsburgh, Pa. (Wrought iron)
Dockstader, Inc., S. E., Washington, D. C.
Durant Insulated Pipe Co., Palo Alto, Calif.
Durant International Corp., Williamstown, N. J.
Johns-Manville, New York, N. Y.
Kaiser Co., E. B., Glenview, Ill.
Michigan Pipe Co., Bay City, Mich.
Orangeburg Mfg. Co., Orangeburg, N. Y.
Porter & Co., Inc., H. W., Newark, N. J.
Ric-wiL Co., The, Barberton, O.
Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Stillwater Clay Products Co., The, Cleveland, O.
Universal Sewer Pipe Co., Cleveland, O.
Water Tight Underground Conduit, Houston, Tex.

CONNECTIONS, DUCT, FLEXIBLE (ASBESTOS, CANVAS, ETC.)

Canvas Products Co., St. Louis, Mo.
Elgen Mfg. Corp., Long Island City, N. Y.
Felters Company, The, Boston, Mass.
Flexaust Co., New York, New York
Flexonics Corp., Maywood, Ill.
Grant Wilson Inc., Chicago, Ill.
Iden Associates, Chicago, Ill.
St. Clair Rubber Co., Detroit, Mich.
Sall Mountain Co., Hamilton, O.
United States Rubber Co., New York, N. Y.
Wagner Awning & Mfg. Co., Cleveland, O.

CONNECTORS, FILLING, HYDROSTATIC TEST

Mechanical Products Corp., Chicago, Ill.
Roylyn, Inc., Glendale, Calif.

CONNECTORS, FOR NON-METALLIC DUCT FABRICATION

Acme Steel Co., Chicago, Ill. (Strapping)
Lumm Co., A. H., Toledo, O.
United States Rubber Co., New York, N. Y.

CONTINUOUS HEATERS

See Heaters, Steam Jet, for Liquids

CONTROL, FOR INDIRECT WATER HEATERS

Barber-Colman Co., Rockford, Ill.
Bell & Gossett Co., Morton Grove, Ill.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Detroit Controls Corp., Detroit, Mich.
General Controls Co., Glendale, Calif.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Klipfel Valves, Inc., Hamilton, O.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Penn Controls, Inc., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Taco Heaters, Inc., Providence, R. I.
Thrush & Co., H. A., Peru, Ind.
Watts Regulator Co., Lawrence, Mass.

CONTROL SYSTEMS, PRE-ASSEMBLED AS UNITS, FOR HEATING, COOLING AND VENTILATING

Factory Assemblies Using Other Manufacturers' Valves, Thermostats, Damper Motors, etc.

American Moistening Co., Providence, R. I.
Automatic Devices Co., Inc., Western Springs, Ill.
Bahnson Co., Winston-Salem, N. C.
Barber-Colman Co., Rockford, Ill.
Barnes & Jones, Inc., Boston, Mass.
Carvell Heat Equipment Co., Los Angeles, Calif.
Dunham Co., C. A., Chicago, Ill.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Iron Fireman Mfg. Co., Cleveland, O.
Master Control Co., The, Cuyahoga Falls, O.
Midwest Automatic Control Co., Des Moines, Ia.
Ray Oil Burner Co., San Francisco, Calif.

CONTROLLERS AND STARTERS, MOTOR

Allen-Bradley Co., Milwaukee, Wis.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Arrow-Hart & Hegeman Elec. Co., Hartford, Conn.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
B/W Controller Corp., Birmingham, Mich.
Borg-Erickson Corp., Chicago, Ill.
Chase-Shawmut Co., Newburyport, Mass.
Clark Controller Co., Cleveland, O.
Cutler-Hammer, Inc., Milwaukee, Wis.
Electric Controller & Mfg. Co., Cleveland, O.
Electric Machinery Mfg. Co., Minneapolis, Minn.
Furnas Electric Co., Batavia, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
Ideal Electric & Mfg. Co., Mansfield, O.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monitor Controller Co., The, Boston, Mass.
Penn Controls, Inc., Goshen, Ind.
Potter & Brumfield Sales Co., Princeton, Ind.
Radex Corp., Chicago, Ill.
Reynolds Electric Co., River Grove, Ill.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Square D Co., Detroit, Mich.
Ward Leonard Electric Co., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.
Zenith Electric Co., Chicago, Ill.

CONTROLS, AIR CONDITIONING

See Humidistats; Indicator-Controllers; Operators, Damper; Operators, Valve; Recorder-Controllers; Regulators; Relays; Switches; Thermostats; Valves, Diaphragm; Valves, Refrigeration; Valves, Solenoid

CONTROLS, DOOR, ELECTRIC EYE (FOR AIR CONDITIONED ROOMS)

De-Tec-Tronic Laboratories, Inc., Chicago, Ill.
Stanley Works, The, New Britain, Conn.
Sterns-Flinn Corp., New York, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.
Worner Electronic Devices, Rankin, Ill.

CONTROLS, DRAFT, BAROMETRIC

Ace Instrument Co., Inc., Brooklyn, N. Y.
Barber-Colman Co., Rockford, Ill.
Boston Machine Works Co., Lynn, Mass.
Bristol Co., The, Waterbury, Conn.
Cleveland Fuel Equipment Co., Cleveland, O.
Cole-Sewell Engineering Co., St. Paul, Minn.
Combustion Equipment Co., Silvis, Illinois
Empire Ventilation Equipment Co., Long Island City, N. Y.
Ess Instrument Co., Bergenfield, N. J.
Field Control Div., H. D. Conkey & Co., Mendota, Ill.
Fuelguard Co., Dallas, Tex.
Fuel Reduction Corp., Chicago, Ill.
Hays Corp., Michigan City, Ind.
Hotstream Heater Co., Cleveland, O.
Krueger Sentry Gauge Co., Green Bay, Wis.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Perfex Corp., Milwaukee, Wis.
Preferred Utilities Mfg. Corp., New York, N. Y.
Salina Metal Products Co., Salina, Kan.
Simplex Mfg. Co., Fond du Lac, Wis.
Steinen Mfg. Co., Wm., Newark, N. J.
Windmaster Corp., Columbus, O.

CONTROLS, FIRE PROTECTION SPRINKLER SYSTEMS

Allen Mfg. Co., W. D., Chicago, Ill.
American District Telegraph Co., New York, N. Y.
Automatic Control Co., St. Paul, Minn.
Barber-Colman Co., Rockford, Ill.
Blaw Knox Co., Power Piping and Sprinkler Div., Pittsburgh, Pa.
Clark Controller Co., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Raisler Corp., Grimes Sprinkler Div., New York, N. Y.
Rockwood Sprinkler Co., Worcester, Mass.
Synchro-Start Products, Inc., Skokie, Ill.
Worner Electronic Devices, Rankin, Ill.

CONTROLS, FLAME FAILURE

American District Telegraph Co., New York, N. Y.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Combustion Control Corp., Boston, Mass.
De-Tec-Tronic Laboratories, Inc., Chicago, Ill.
Drying Systems, Inc., Chicago, Ill.
Ess Instrument Co., Bergenfield, N. J.
Fenwal Inc., Ashland, Mass.
Fuelguard Co., Dallas, Tex.
General Controls Co., Glendale, Calif. and Skokie, Ill.
Haney Gas Burner & Engrs., Monrovia, Calif.
Mercoid Corp., The, Chicago, Ill.
Mettler Co., Inc., The, Los Angeles, Calif.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneaoplis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Penn Controls, Inc., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Stout & Sons, David, St. Louis, Mo.
Webster Engineering Co., Tulsa, Okla.
Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.
White-Rodgers Electric Co., St. Louis, Mo.

CONTROLS, HEATING

See Alarms; Humidistats; Indicator-Controllers; Operators, Damper; Operators, Valve; Recorder-Controllers; Regulators; Relays; Switches; Systems, Combustion Control; Systems, Heating; Thermostats; Valves, Balancing, Radiator; Valves, Diaphragm; Valves, Flow Control; Valves, Mixing; Valves, Pressure Reducing and Regulating; Valves, Radiator; Valves, Solenoid

CONTROLS, PUSH-PULL

See Shafts, Flexible, Push-Pull, for Control

CONTROLS, REFRIGERATION

See Humidistats; Operators, Valve; Relays; Switches; Thermostats; Valves, Refrigeration; Valves, Solenoid

CONVECTORS

See Radiation, Convection Type

CONVERTORS, STEAM

Alstrom Corp., Bronx, N. Y.
American District Steam Co., Inc., North Tonawanda, N. Y.
Bell & Gossett Co., Morton Grove, Ill.
General Fittings Co., Providence, R. I.
General Heaters & Regulators Co., East Chicago, Ind.
Lindy Heaters, Inc., New York, N. Y.
Manning & Lewis Engineering Co., Newark, N. J.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Richmond Engineering Co., Inc., Richmond, Va.
Yula Water Heaters, Inc., New York, N. Y.

CONVEYORS, COAL AND ASH

Ajax Flexible Coupling Co., Westfield, N. Y.
American Coal Burner and Wood Stoker Corp., Chicago, Ill.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence R. I.
Canton Stoker Corp., Canton, O.
Chain Belt Co., Milwaukee, Wis.
Chicago Fire Brick Co., Chicago, Ill.
Cleveland Tramrail Div., Cleveland Crane & Eng. Co., Wickliffe, O.
CraneVeyor Corp., Los Angeles, Calif.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Farquhar Co., A. B., Div. of The Oliver Co., York, Pa.
Hager Bros., Rockford, Ill.
Jeffrey Mfg. Co., Columbus, O.
Johnston & Jennings Co., Cleveland, O.
Joy Mfg. Co., Pittsburgh, Pa.
Link-Belt Co., Chicago, Ill.
Spurgeon Co., Van Dyke, Mich.
Standard Transmission Equipment Co., Pasadena, Calif.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Whitty Co., Inc., Boston, Mass.

COOLERS, CRANE CAB

Dravo Corp., Pittsburgh, Pa.
Lintern Corp., Painesville, O.
Refrigeration Economics Co., Inc., Canton, O.
Trane Co., The, LaCrosse, Wis.

COOLERS, EVAPORATIVE

See Units, Air Conditioning, Summer, Evaporative Cooling Type

COOLERS, OIL

Acme Industries, Inc., Jackson, Mich.
American Cooling Tower Co., Kansas City, Mo.
American District Steam Co., Inc., North Tonawanda, N. Y.
American Locomotive Co., Alco Products Div., Dunkirk, N. Y.
Andale Co., Philadelphia, Pa.
Armstrong Co., Richard M., Westchester, Pa.
Baltimore Aircoil Co., Inc., Baltimore, Md.
Bell & Gossett Co., Morton Grove, Ill.
Brown Fintube Co., The, Elyria, O.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Clifford Mfg. Co., Div. of Standard-Thomson Corp., Waltham, Mass
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Downingtown Iron Works, Downingtown, Pa.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Fluor Corp., Ltd., The, Los Angeles, Calif.
G & O Mfg. Co., New Haven, Conn.
General Heaters & Regulators Co., East Chicago, Ind.
Gilbert Brass Foundry Co., St. Louis, Mo.
Graham Mfg. Co., Inc., New York, N. Y.
Griscom-Russell Co., The, Massillon, O.
Halstead & Mitchell, Pittsburgh, Pa.
Heatron, Inc., York, Pa.
Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Kewanee-Ross Corp., Kewanee, Ill.
Manning & Lewis Engineering Co., Newark, N. J.
Marlo Coil Co., St. Louis, Mo.
McIntyre Engineering Co., Inc., South San Francisco, Calif.
Modine Mfg. Co., Racine, Wis.
National Pipe Bending Co., New Haven, Conn.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Perfex Corp., Milwaukee, Wis.
Refrigeration Economics Co., Inc., Canton, O.
Reliable Products Mfg. Co., Brooklyn, N. Y.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Sims Co., Erie, Pa.
Struthers Wells Corp., Titusville, Pa.
Superior Combustion Industries, Inc., New York, N. Y.
Super Radiator Corp., Minneapolis, Minn.
Taco Heaters, Inc., Providence, R. I.
Temprite Products Corp., Birmingham, Mich.
Trane Co., The, LaCrosse, Wis.
Tranter Mfg., Inc., Lansing, Mich.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Vogt Machine Co., Henry, Louisville, Ky.
Whitlock Mfg. Co., Hartford, Conn.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.
Yula Water Heaters, Inc., New York, N. Y.

COOLERS, UNIT (FLOOR TYPE)

Not air conditioning units, but floor mounted unit with coil and centrifugal fans without filters, for connection to remote compressor or cold water supply. For air conditioning units see Units, Air Conditioning

Acme Industries, Inc., Jackson, Mich.
American Blower Corp., Detroit, Mich.
Bakeraire Corp., South Windham, Me.
Baltimore Aircoil Co., Inc., Baltimore, Md.
Buffalo Forge Co., Buffalo, N. Y.
Bush Mfg. Co., West Hartford, Conn.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Conditionaire Unit Co., Chicago, Ill.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Drayer-Hanson, Inc., Los Angeles, Calif.
Economy Equipment Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Governair Corp., Oklahoma City, Okla.
Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
King Co., The, Owatonna, Minn.
Larkin Coils, Inc., Atlanta, Ga.
Marlo Coil Co., St. Louis, Mo.
McIntyre Engineering Co., Inc., South San Francisco, Calif.
McQuay, Inc., Minneapolis, Minn.
Modine Mfg. Co., Racine, Wis.
Niagara Blower Co., New York, N. Y.
Reco Products Div., Recony Corp., New York, N. Y.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Rigidbilt Inc., Chicago, Ill.
Rinehart Inc., Richmond, Ind.
St. Louis Blow Pipe & Heater Co., Div. of Young Sales Corp., St. Louis, Mo.
Silco Products, Inc., Minneapolis, Minn.
Super-Cold Corp., Los Angeles, Calif.
Tenney Engineering, Inc., Newark, N. J.
Trane Co., The, La Crosse, Wis.
United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.

COOLERS, UNIT (SUSPENDED TYPE)

Not air conditioning units, but suspended unit with coil and propeller fan, without filters, for connection to remote compressor or cold water supply. For air conditioning units, see Units, Air Conditioning

American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
American Cooling Tower Co., Kansas City, Mo.
Auburn Burner Co., Auburn, Ind.
Bakeraire Corp., South Windham, Me.
Betz Corp., Hammond, Ind.
Buffalo Forge Co., Buffalo, N. Y.
Bush Mfg. Co., West Hartford, Conn.
Carrier Corp., Syracuse, N. Y.
Conditionaire Unit Co., Chicago, Ill.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo
Drayer-Hanson, Inc., Los Angeles, Calif.
Economy Equipment Co., Chicago, Ill.
Fedders-Quigan Corp., Buffalo, N. Y.
Frigidaire Div., General Motors Corp., Dayton, O.
Governair Corp., Oklahoma City, Okla.
Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
King Co., The, Owatonna, Minn.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Marlo Coil Co., St. Louis, Mo.
McIntyre Engineering Co., Inc., South San Francisco, Calif.
McQuay, Inc., Minneapolis, Minn.
Merchant & Evans Co., Philadelphia, Pa.
Murray Mfg. Co., D. J., Wausau, Wis.
Niagara Blower Co., New York, N. Y.
Refrigeration Appliances, Inc., Chicago, Ill.

Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rinehart Inc., Richmond, Ind.
St. Louis Blow Pipe & Heater Co., Div. of Young Sales Corp., St. Louis, Mo.
Silco Products, Inc., Minneapolis, Minn.
Super-Cold Corp., Los Angeles, Calif.
Tenney Engineering, Inc., Newark, N. J.
Trane Co., The, La Crosse, Wis.
United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wilson Engineering Corp., Chicago, Ill.
Wing Mfg. Co., L. J., Linden, N. J.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.

COOLING COILS

See Surface, Cooling

COOLING SURFACE

See Surface, Cooling

COOLING TOWERS

See Towers, Cooling

COOLING UNITS

See Units, Air Conditioning; Coolers, Unit

COPPER PIPE

See Pipe, Brass and Copper

COPPER SHEETS

See Sheets, Copper

COPPER TUBE FITTINGS

See Fittings, Copper Tube

COPPER TUBE FITTINGS, FLARED

See Fittings, Copper Tube, Flared

COPPER TUBING

See Tubing, Brass and Copper

CORROSION PREVENTIVES

See Devices, Electrolytic, for Preventing Corrosion; Treatment, Steam System, to Inhibit Corrosion; and Treatment, Water, to Inhibit Corrosion

COUNTERS, DUST

Bausch & Lomb Optical Co., Rochester, N. Y.
Hill & Co., E. Vernon., Lake Geneva, Wis.
Mine Safety Appliances Co., Pittsburgh, Pa.
Service to Industry, West Hartford, Conn.
Willson Products, Inc., Reading, Pa.

COUPLINGS, FLEXIBLE, POWER TRANSMISSION

Ajax Flexible Coupling Co., Westfield, N. Y.
American Flexible Coupling Co., Erie, Pa.
Blood Brothers Machine Div., Rockwell Spring and Axle Co., Allegan, Mich. (Universal joints)
Boston Gear Wks., Quincy, Mass.
Brooks Equipment Corp., Hoboken, N. J.
Browning Mfg. Co., Inc., Maysville, Ky.
Caldwell Co., W. E., Louisville, Ky.
Central Die Casting & Mfg. Co., Inc., Chicago, Ill.
Certified Flexible Couplings, New York, N. Y.
Chain Belt Co., Milwaukee, Wis.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Climax Metal Products Co., Cleveland, O.
Congress Drives Div., Tann Corp., Detroit, Mich.
De Laval Steam Turbine Co., Trenton, N. J.
Diamond Chain Co., Inc., Indianapolis, Ind.
Dings Magnetic Separator Co., Milwaukee, Wis.
Dodge Mfg. Corp., Mishawaka, Ind.
Elliott Co., Crocker-Wheeler Div., Ampere, N. J.
Falk Corp., Milwaukee, Wis.
Guardian Products Corp., Michigan City, Ind.
Jeffrey Mfg. Co., Columbus, O.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Koppers Co., Inc., Metal Products Div., Baltimore, Md.
Lord Mfg. Co., Erie, Pa.
Lovejoy Flexible Coupling Co., Chicago, Ill.
Medart Co., St. Louis, Mo.
Mercury Clutch Div., Automatic Steel Products, Inc., Canton, O. (automatic centrifugal clutch)
Morse Chain Co., Detroit, Mich.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Piezo Mfg. Corp., New York, N. Y.
Poole Foundry & Machine Co., Baltimore, Md.
Ramsey Chain Co., Inc., Albany, N. Y.
Royersford Foundry & Machine Co., Inc., Royersford, Pa.
Shallcross Co., Philadelphia, Pa.
Sier Bath Gear & Pump Co., Inc., North Bergen, N. J.
Smith & Serrell, Inc., Newark, N. J.
Thomas Flexible Coupling, Warren, Pa.
Waldron Corp., John, New Brunswick, N. J.
Westinghouse Electric Corp., Pittsburgh, Pa.
Whitney Chain Co., Hartford, Conn.
Wood's Sons Co., T. B., Chambersburg, Pa.

COUPLINGS, PIPE

Aero-Coupling Corp., Burbank, Calif.
Aeroquip Corp., Jackson, Mich.
Byers Co., A. M., Pittsburgh, Pa. (Wrought iron)
Camco Products Inc., North Haven, Conn.
Capitol Mfg. & Supply Co., Columbus, O.
Champion Machine & Forging Co., Cleveland, O.
Chase Brass & Copper Co., Waterbury, Conn.
Clow & Sons, James B., Chicago, Ill.
Continental-Diamond Fibre Co., Newark, Del.
Cooper-Alloy Foundry Co., The, Hillside, N. J.
Crane Co., Chicago, Ill.
Detroit Brass & Malleable Works, Detroit, Mich.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Drinkwater, Inc., Waukegan, Ill.
Fischer & Porter Co., Hatboro, Pa. (glass)
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Flodar Corp., Cleveland, O.
Frick Co., Waynesboro, Pa.
Frontier Bronze Corp., Niagara Falls, N. Y.
Gilbert Brass Foundry Co., St. Louis, Mo.
Grabler Mfg. Co., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Gustin-Bacon Mfg. Co., Kansas City, Mo.
Harrisburg Steel Corp., Harrisburg, Pa.
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Kennedy Valve Mfg. Co., Elmira, N. Y.
King Union Co., Inc., Hillsgrove, R. I.
Ladish Co., Cudahy, Wis.
Malleable Iron Fittings Co., Branford, Conn.
Marman Products Co., Inc., Los Angeles, Calif.
Master Enterprise Corp. of America, Tulsa, Okla.
Morris Coupling & Clamp Co., Ellwood City, Pa.
Mueller Brass Co., Port Huron, Mich.
National Tube Div., United States Steel Corp., Pittsburgh, Pa.
Pacific Fittings Div., General Metals Corp., Hollydale, Calif.
Pittsburgh Steel Co., Pittsburgh, Pa.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Rhode Island Fittings Co., Providence, R. I.
Star Stainless Screw Co., Paterson, N. J.
Stockham Valves & Fittings, Birmingham, Ala.
Stokes Molded Products, Inc., Trenton, N. J. (Hard rubber)
Tube Turns, Inc., Louisville, Ky. (welding couplings)
Union Metal Works, Chelsea, Mass.
United States Gasket Co., Camden, N. J.
U. S. Plug & Fitting Co., Wellington, O.
United States Stoneware Co., New York, N. Y.
Victaulic Co. of America, Elizabeth, N. J.
Vogt Machine Co., Henry, Louisville, Ky.
Wachs Co., E. H., The, Chicago, Ill.
Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.
Weatherhead Co., The, Cleveland, O.
Wheatland Tube Co., Philadelphia, Pa.
Wheeling Machine Products Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wiggins Oil Tool Co., Inc., E. B., Los Angeles, Calif.
Youngstown Sheet & Tube Co., Youngstown, O.

COUPLINGS, PIPE, DETACHABLE

Aero-Coupling Corp., Burbank, Calif.
Aeroquip Corp., Jackson, Mich.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Drinkwater, Inc., Waukegan, Ill.
Gates Engineering Co., Wilmington, Del.
Quik Joint Mfg. Co., Harvey, Ill.
Morris Coupling & Clamp Co., Ellwood City, Pa.
Roylyn, Inc., Glendale, Calif.
Smith Bros. Co., Oak Park, Ill.
Snap-Tite, Inc., Union City, Pa.
Victaulic Co. of America, Elizabeth, N. J.
Wiggins Oil Tool Co., Inc., E. B., Los Angeles, Calif.

CRANE CAB COOLERS

See Coolers, Crane Cab

CUT-OFFS, LOW WATER, HEATING BOILER

B/W Controller Corp., Birmingham, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
General Controls Co., Glendale, Calif. and Skokie, Ill.
Johnson Corp., The, Three Rivers, Mich.
Magnetrol, Inc., Chicago, Ill.
Maid-O'-Mist, Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Newark Controls Co., Bloomfield, N. J.

Schaub Engineering Co., Fred H., Chicago, Ill.
Watts Regulator Co., Lawrence, Mass.
Webster & Co., Warren, Camden, N. J.

CUTTERS, FLAME FOR PIPING

Springload Mfg. Corp., Seattle, Wash.
Vernon Tool Co., Ltd., Alhambra, Calif.

CUTTERS, PIPE

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Atkins Saw Div., Borg-Warner Corp., Indianapolis, Ind.
Barnes Tool Co., The, New Haven, Conn.
Beaver Pipe Tools, Inc., Warren, O.
Capewell Mfg. Co., Hartford, Conn.
Continental Machine Co., Chicago, Ill.
Crown Die & Tool Co., Chicago, Ill.
Erie Tool Works, Erie, Pa.
Gaines-Collins, Quijada Tool Division, Los Angeles, Calif.
Hollands Mfg. Co., Erie, Pa.
Kalamazoo Tank & Silo Co., Machine Tool Div., Kalamazoo, Mich. (metal cutting band saw)
Landis Machine Co., Inc., Waynesboro, Pa.
M-M-A, Inc., Lancaster, Pa.
Nye Tool Co., Chicago, Ill.
Oster Mfg. Co., Cleveland, O.
Reed Mfg. Co., Erie, Pa.
Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Saunders Mfg. Co., Yonkers, N. Y.
Springload Mfg. Corp., Seattle, Wash.
Talon Tools, Inc., North Arlington, N. J.
Toledo Pipe Threading Machine Co., Toledo, O.
Tri-Clover Machine Co., Kenosha, Wis.
Wachs Co., E. H., The, Chicago, Ill. (pipe saw)

CUTTERS, TUBING

Armstrong Bros. Tool Co., Chicago, Ill.
Bonney Forge & Tool Works, Allentown, Pa.
Capewell Mfg. Co., Hartford, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Specialty Mfg. Co., Chicago, Ill.
Continental Machine Co., Chicago, Ill.
Couplings Co., Chicago, Ill.
Duro Metal Products Co., Chicago, Ill.
Everhot Products Co., Chicago, Ill.
Gaines-Collins, Quijada Tool Division, Los Angeles, Calif.
Imperial Brass Mfg. Co., Chicago, Ill.
Landis Machine Co., Inc., Waynesboro, Pa.
Mueller Brass Co., Port Huron, Mich.
Nye Tool Co., Chicago, Ill.
Parker Appliance Co., The, Cleveland, O.
Penn Brass & Copper Co., Erie, Pa.
Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-on Tools Corp., Kenosha, Wis.
Talon Tools, Inc., North Arlington, N. J.
Tri-Clover Machine Co., Kenosha, Wis.
Weatherhead Co., Cleveland, O.

DAMPER OPERATORS

See Operators, Damper

DAMPER REGULATORS

See Regulators, Damper Sets

DAMPERS, DIFFUSER

Air Control Products, Inc., Coopersville, Mich.
Anemostat Corp. of America, New York, N. Y.
Barber-Colman Co., Rockford, Ill.
Rittling Corp., The, Buffalo, N. Y.
United States Register Co., Battle Creek, Mich.

DAMPERS, DUCT, MANUALLY OPERATED

Acme Mfg. Co., Holmesburg, Philadelphia, Pa.
Adams Co., The, Dubuque, Ia.
Adelta Mfg. Co., Inc., Philadelphia, Pa.
Air Control Products, Inc., Coopersville, Mich.
Air-Factors, Inc., Monrovis, Calif.
Air & Refrigeration Corp., New York, N. Y.
American Foundry & Furnace Co., Bloomington, Ill.
American Warming & Ventilating Co., Toledo, O.
Ammerman Co., C. L., Minneapolis, Minn.
Anemostat Corp. of America, New York, N. Y.
Barnes Co, A. D., Dayton, O.
Controlair Mfg. Co., Los Angeles, Calif.
Corbman Bros., Inc., Philadelphia, Pa.
Elgo Shutter & Mfg. Co., Detroit, Mich.
Excelsior Steel Furnace Co., Chicago, Ill.
Hart & Cooley Mfg. Co., Holland, Mich.
Inland Steel Products Co., Milwaukee, Wis.
Jacobs Co., Inc., B. & J., Cincinnati, O.
Johnson Service Co., Milwaukee, Wis.
Kerentoff, G. L., Cincinnati, O.
Martens & Stormoen, West Quincy, Mass.
Minneapolis Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Rittling Corp., The, Buffalo, N. Y.
Sioux Steel Co., Sioux Falls, S. D.
Titus Mfg. Corp., Waterloo, Ia.
Tuttle & Bailey, Inc., New Britain, Conn.
United States Register Co., Battle Creek, Mich.
Young Regulator Co., Cleveland, O.

DAMPERS, DUCT, REMOTE CONTROLLED

Air & Refrigeration Corp., New York, N. Y.
American Foundry & Furnace Co., Bloomington, Ill.
American Warming & Ventilating Co., Toledo, O.
Anemostat Corp. of America, New York, N. Y.
Au-Temp-Co Corp., New York, N. Y.
Barber-Colman Co., Rockford, Ill.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Buensod-Stacey, Inc., New York, N. Y.
Combustion Equipment Co., Silvis, Ill.
Conoflow Corp., Philadelphia, Pa.
Controlair Mfg. Co., Los Angeles, Calif.
Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Rittling Corp., The, Buffalo, N. Y.
Shallcross Controls, Inc., Milwaukee, Wis.
Tuttle & Bailey, Inc., New Britain, Conn.
Vapor Heating Corp., Chicago, Ill.
Young Regulator Co., Cleveland, O.

DAMPERS, PULSATION, FOR PIPING SYSTEMS

Campbell Co., J. A., Long Beach, Calif.
Greer Hydraulics, Inc., Brooklyn, N. Y.
Industrial Acoustics Co., New York, N. Y.
Taylor Instrument Companies, Rochester, N. Y.

DEAERATORS

Acker Organization, Inc., W. M., Cleveland, O.
American Water Softener Co., Philadelphia, Pa.
Belco Industrial Equipment Div., Inc., Paterson, N. J.
Buflovak Equipment Div. of Blaw-Knox Co., Buffalo, N. Y.
Cochrane Corp., Philadelphia, Pa.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Elgin-Refinite, Div. of Elgin Softener Corp., Elgin, Ill.
Elliott Co., Jeannette, Pa.
Fluor Corp., Ltd., The, Los Angeles, Calif.
General Filter Co., Ames, Ia.
General Heaters & Regulators Co., East Chicago, Ind.
Graham Mfg. Co., Inc., New York, N. Y.
Graver Water Conditioning Co., New York, N. Y.
Hoppes Mfg. Co., Inc., Springfield, O.
Kewanee-Ross Corp., Kewanee, Ill.
Permutit Co., New York, N. Y.
Schaub Engineering Co., Fred H., Chicago, Ill.
Sims Co., Erie, Pa.
Stickle Steam Specialties Co., Indianapolis, Ind.
Swartwout Co., The, Cleveland, O.
Whitlock Mfg. Co., Hartford, Conn.
Worthington Corp., Harrison, N. J.

DEEP WELL PUMPS

See Pumps, Deep Well

DEHUMIDIFIERS, ABSORPTION AND ADSORPTION

Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O.
Carbide and Carbon Chemicals Div., Union Carbide and Carbon Corp., New York, N. Y.
Cargocaire Engineering Corp., New York, N. Y.
Daly, Merritt & Sullivan, Inc., Falls Church, Va.
Dow Chemical Co., The, Midland, Mich.
Drying Systems, Inc., Chicago, Ill.
Dryomatic Corp., Alexandria, Va.
Floridin Co., Warren, Pa.
Kaufman Co., H. J., Detroit, Mich.
Kemp Mfg. Co., C. M., Baltimore, Md.
Niagara Industrial Corp., New York, N. Y.
Pittsburgh Lectrodryer Corp., Pittsburgh, Pa.
Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Selas Corp. of America, Philadelphia, Pa.
Socony-Vacuum Oil Co., Inc., New York, N. Y.
Somers, Inc., H. J., Detroit, Mich.
Surface Combustion Corp., Toledo, O.
Tamms Industries, Inc., Chicago, Ill.

DEHUMIDIFIERS FOR COMPRESSED AIR

Centrifix Corp., Cleveland, O.
General Heaters & Regulators Co., East Chicago, Ind.
Glenwood-Inglewood Co., Minneapolis, Minn.
Kemp Mfg. Co., C. M. Baltimore, Md.
Pittsburgh Lectrodryer Corp., Pittsburgh, Pa.
Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.

DEHUMIDIFIERS, ELECTRIC PLUG-IN, FOR SMALL SPACES

Abbeon Supply Co., Jamaica, N. Y.

Bern's Mfg. Corp., Chicago, Ill.
Blissfield Mfg. Co., Blissfield, Mich.
Cargocaire Engineering Corp., New York, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Circulators & Devices Mfg. Corp., Brooklyn, N. Y.
Dryomatic Corp., Alexandria, Va.
Ebco Mfg. Co., Columbus, O.
Fedders-Quigan Corp., Buffalo, N. Y.
Fresh'nd-Aire Company, Div. of Cory Corp., Chicago, Ill.
Frigidaire Div., General Motors Corp., Dayton, O.
Haertel Co., Walter, Minneapolis, Minn.
Hotpoint Co., Chicago, Ill.
Hunter Fan & Ventilating Co., Inc., Memphis, Tenn.
Jordon Refrigerator Co., Inc., Philadelphia, Pa.
Kauffman Air Conditioning Co., St. Louis, Mo.
Kemp Mfg. Co., C. M., Baltimore, Md.
Longergan Mfg. Co., Albion, Mich.
Mitchell Mfg. Co., Chicago, Ill.
Ohio Foundry & Mfg. Co., Steubenville, O.
Radio Corp., of America, RCA Victor Div., Camden, N. J.
Remington Air Conditioning Div., Remington Corp., Auburn, N. Y.
Robbins & Myers, Inc., Fan Div., Memphis, Tenn.
Taylor Co., Halsey W., Warren, O.
Victor Products Corp., Hagerstown, Md.
Viking Air Conditioning Div., The National Radiator Co., Cleveland, O.
Walton Laboratories, Inc., Irvington, N. J.
Westinghouse Electric Corp., Electric Appliance Div., East Springfield, Mass.

DEHUMIDIFIERS, SPRAY

See Washers, Air

DEHUMIDIFIERS, SPRAYED COIL

Air & Refrigeration Corp., New York, N. Y.
Blazer, M. & Son, Passaic, N. J.
Carrier Corp., Syracuse, N. Y.
Kennard Corp., St. Louis, Mo.
Marlo Coil Co., St. Louis, Mo.
Silco Products, Inc., Minneapolis, Minn.
York Corp., York, Pa.

DEHUMIDIFYING UNITS

See Units, Air Conditioning; Dehumidifiers.

DEHYDRANT AND ACID NEUTRALIZER, FOR REFRIGERATING SYSTEMS

Allin Mfg. Co., Chicago, Ill.
Davison Chemical Corp., The, Baltimore, Md.
Highside Chemicals Co., Clifton, N. J.
McIntire Co., The, Newark, N. J.
Mueller Brass Co., Port Huron, Mich.
Remco, Inc., Zelienople, Pa.
Selas Corp. of America, Philadelphia, Pa.

DEHYDRATORS, REFRIGERANT

A-P Controls Corp., Milwaukee, Wis.
Aluminum Co. of America, Pittsburgh, Pa.
Ansul Chemical Co., Refrigeration Div., Marinette, Wis.
Eagle Chemical Co., Inc., Joliet, Ill.
Floridin Co., Warren, Pa.
Frigidaire Div., General Motors Corp., Dayton, O.
Gannon Co., Inc., The, Russell R., Cincinnati, O.
Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Kenmore Machine Products, Inc., Lyons, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Madden Brass Products Co., Chicago, Ill.
McIntire Co., The, Newark, N. J.
Mueller Brass Co., Port Huron, Mich.
Remco, Inc., Zelienople, Pa.
Sealed Unit Parts Co., Inc., Bronx, N. Y.
Selas Corp. of America, Philadelphia, Pa.
Shank Co., Cyrus, Cicero, Ill.
Sporlan Valve Co., St. Louis, Mo.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Techniflex Corp., Port Jervis, N. Y.
Wabash Mfg. Co., Chicago, Ill.

DENSIFIERS, CONCRETE, FOR INCREASING THERMAL CONDUCTIVITY

Lee-Don, Inc., Pittsburgh, Pa.

DESTROYERS, SOOT, CHEMICAL

Allen Co., Robert G., Mechanicsville, N. Y.
Ampion Corp., Long Island City, N. Y.
Bird-Archer Co., Philadelphia, Pa.
Black & White Chemical Co., New York, N. Y.
Coughlan Co., G. N., West Orange, N. J.
Diamond Chemical Products, New York, N. Y.
General Filters, Inc., Novi, Mich.
Healy Ruff Co., St. Paul, Minn.
Hercules Chemical Co., Inc., New York, N. Y.
Kenite Laboratory, Inc., Madison, N. J.
MacDermid Chemical Co., Bristol, Conn.
Madden Corp., The, Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.
National Aluminate Corp., Chicago, Ill.
Nutmeg Chemical Co., New Haven, Conn.
O'Brien Industries, Caldwell, N. J.
Perolin Co., Inc., Chicago, Ill.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Saverite Engineering Co., Hoboken, N. J.
Tamms Industries, Inc., Chicago, Ill.
Vinco Co., Inc., The, New York, N. Y.
Warren Refining & Chemical Co., The, Cleveland, O.
Western Chemical Co., Kansas City, Mo.

DESUPERHEATERS, STEAM

Babcock & Wilcox Co., New York, N. Y.
Bailey Meter Co., Cleveland, O.
Brown Fintube Co., The, Elyria, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Copes-Vulcan Div., Continental Foundry & Machine Co., Erie, Pa.
Foster Wheeler Corp., New York, N. Y.
Hagan Corp., Pittsburgh, Pa.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Spence Engineering Co., Inc., Walden, N. Y.
Springfield Boiler Co., Springfield, Ill.
Swartwout Co., The, Cleveland, O.
Whitlock Mfg. Co., Hartford, Conn.

DETECTORS, LEAK, REFRIGERANT

Allin Mfg. Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Gates & Co., Inc., George W., Franklin Sq., L. I., N. Y.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Goss Gas, Inc., Pittsburgh, Pa.
Highside Chemicals Co., Clifton, N. J.
Insto-Gas Corp., Detroit, Mich.
Justrite Mfg. Co., Chicago, Ill.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Turco Products, Inc., Los Angeles, Calif.
Turner Brass Wks., Sycamore, Ill.
Vacuum-Electronic Engineering Co., New Hyde Park, L. I., N. Y.
Velocity Power Tool Co., Pittsburgh, Pa.

DETECTORS, LEAK, UNDERGROUND PIPING

Fisher Research Laboratory, Inc., Palo Alto, Calif.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Johnson-Williams Ltd., Palo Alto, Calif.
Radioactive Products, Inc., Detroit, Mich.
Wilkinson Products Co., Pasadena, Calif.

DEVICES, ELECTROLYTIC, FOR PREVENTING CORROSION

Aqua Electric Scale Control, Inc., Cleveland, O.
Brown Electro Co., Oklahoma City, Okla.
Electro Rust-Proofing Corp., Belleville, N. J.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Harco Corp., Cleveland, O.
Magnode Products, Inc., Trenton, O.
Marlo Coil Co., St. Louis, Mo.
McRay Products Co., South Pasadena, Calif.
National Carbon Co., Div. of Union Carbide & Carbon Corp., New York, N. Y.
Rotometals, San Francisco, Calif.
Wallace & Tiernan Co., Inc., Newark, N. J.

DEW POINT INDICATORS

See Indicators, Dew Point

DIAPHRAGM VALVES

See Valves, Diaphragm

DIESEL ENGINES

See Engines, Diesel, for Fan, Pump and Compressor Drives

DIFFUSERS, AIR

See also Grilles; Panels, Perforated, for Air Diffusion; Registers

Aerotrol Engineering Co., Pittsburgh, Pa.
Air Control Products, Inc., Coopersville, Mich.
Air Devices, Inc., New York, N. Y.
Aladdin Heating Corp., San Leandro, Calif.
Anemostat Corp. of America, New York, N. Y.
Ashburn Supply Co., Culver City, Calif.
Barber-Colman Co., Rockford, Ill.
Carnes Co., W. R., Verona, Wis.
Connor Engineering Corp., Danbury, Conn.
Demuth & Sons, Charles, Mineola, L. I., N. Y.
Hart & Cooley Mfg. Co., Holland, Mich.
Krueger Air Conditioning Co., Tucson, Ariz.
Lima Register Co., The, Lima, O.
Multi-Vent Div., Pyle-National Co., The, Chicago, Ill.
Titus Mfg. Corp., Waterloo, Ia.
Tuttle & Bailey, Inc., New Britain, Conn.
United States Register Co., Battle Creek, Mich.
Universal Diffuser Corp., New York, N. Y.

DIFFUSERS, AIR, CEILING WITH COMBINED LIGHTING FIXTURE

Air Devices, Inc., New York, N. Y.
Anemostat Corp. of America, New York, N. Y.
Barber-Colman Co., Rockford, Ill.
Connor Engineering Corp., Danbury, Conn.
Universal Diffuser Corp., New York, N. Y.

DIFFUSERS, AIR, HIGH PRESSURE

Anemostat Corp. of America, New York, N. Y.
Barber-Colman Co., Rockford, Ill.
Connor Engineering Corp., Danbury, Conn.
Tuttle & Bailey, Inc., New Britain, Conn.
Universal Diffuser Corp., New York, N. Y.

DIFFUSION, AIR

See Panels, Perforated, for Air Diffusion

DISTRIBUTORS, WATER, FOR CONDENSERS

Condenser Service & Engineering Co., Inc., Hoboken, N. J.

DOOR CONTROLS

See Controls, Door, Electric Eye

DOORS AND PANELS, ACCESS

Adams Co., The, Dubuque, Ia.
Air & Refrigeration Corp., New York, N. Y.
American Foundry & Furnace Co., Bloomington, Ill.
American Sheet Metal Works, New Orleans, La.
Auer Register Co., Cleveland, O.
Biersach & Niedermeyer Co., Milwaukee, Wis.
Camloc Fastener Corp., Paramus, N. J. (Fasteners for)
Clarage Fan Co., Kalamazoo, Mich.
Decatur Iron & Steel Co., Decatur, Ala.
Falstrom Co., Passaic, N. J.
Inland Steel Products Co., Milwaukee, Wis.
International Steel Co., Evansville, Ind.
Kane Mfg. Corp., Kane, Pa.
Kirk & Blum Mfg. Co., Cincinnati, O.
Knapp Bros. Mfg. Co. Inc., Cincinnati, O.
Lockjoint Wood Products Co., Wichita, Kan.
Lumm Co., A. H., Toledo, O.
Technical Ply-Woods, Chicago, Ill.
Walsh Co., L. M., The, Boston, Mass.
Western Wire & Iron Works, Inc., Chicago, Ill. (Metal)

DRAFT CONTROL

See Controls, Draft, Barometric; Regulators, Draft, Combustion

DRAFT GAGES

See Gages, Indicating, Draft

DRAFT RECORDERS

See Recorders, Draft

DRAFT REGULATORS

See Controls, Draft, Barometric; Regulators, Draft, Combustion

DRAWING TEMPLATES, PIPING

See Templates, Drawing, Piping

DRIERS

See Dehydrators, Refrigerant

DRILLS, ELECTRIC AND PNEUMATIC, PORTABLE

Albertson & Co., Inc., Sioux City, Ia.
Black & Decker Mfg. Co., Towson, Md.
Buckeye Tools Corp., Dayton, O.
Chicago Pneumatic Tool Co., New York, N. Y.
Cincinnati Electrical Tool Co., The, Cincinnati, O.
Clark Electric Co., Jas., Jr., Louisville, Ky.
Cummins Portable Tool Co., Chicago, Ill.
Famco Machine Co., Kenosha, Wis.
Fasco Industries, Inc., Rochester, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Jaco Devices Co., Hingham, Mass.
Joy Mfg. Co., Pittsburgh, Pa.
Keller Tool Co., Grand Haven, Mich.
Lee Co., K. O., Aberdeen, S. D.
Mall Tool Co., Chicago, Ill.
Millers Falls Co., Greenfield, Mass.
Milwaukee Electric Tool Corp., Milwaukee, Wis.
Porter-Cable Machine Co., Syracuse, N. Y.
Portable Electric Tools, Inc., Chicago, Ill.
R C S Tool Sales Corp., Joliet, Ill.
Skil Corp., Chicago, Ill.
Spartan Tool Co., Chicago, Ill.
Speedway Mfg. Co., Chicago (Cicero), Ill.
Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.
Syntron Co., Homer City, Pa.
Tempo Products Co., Cleveland, O.
Thor Power Tool Co., Aurora, Ill.
U. S. Electrical Tool Co., Cincinnati, O.
Wodack Electric Tool Corp., Chicago, Ill.

DRILLS, MASONRY

Carboloy Div. of General Electric Co., Detroit, Mich.
Chicago Expansion Bolt Co., Chicago, Ill.
Chicago Pneumatic Tool Co., New York, N. Y.
Paine Co., Addison, Ill.
Rawplug Co., Inc., The, New York, N. Y.
Tempo Products Co., Cleveland, O.
Termite Drills, Inc., Pasadena, Calif.
Threadwell Tap & Die Co., Greenfield, Mass.
U. S. Expansion Bolt Co., York, Pa.

DRILLS, POWDER OPERATED

Powder Power Tool Corp., Portland, Ore.
Remington Arms Co., Inc., Bridgeport, Conn.
Tempo Products Co., Cleveland, O.
Velocity Power Tool Co., Pittsburgh, Pa. (drives studs for pipe hangers, etc. into concrete)

DRIVES, CHAIN

Boston Gear Works, Quincy, Mass.
Browning Mfg. Co., Inc., Maysville, Ky.
Caldwell Co., W. E., Louisville, Ky.
Chain Belt Co., Milwaukee, Wis.
CraneVeyor Corp., Los Angeles, Calif.
Diamond Chain Co., Inc., Indianapolis, Ind.
Dodge Mfg. Corp., Mishawaka, Ind.
Ft. Worth Steel & Machinery Co., Ft. Worth, Tex.
Jeffrey Mfg. Co., Columbus, O.
Medart Co., St. Louis, Mo.
Morse Chain Co., Detroit, Mich.
Ramsey Chain Co., Inc., Albany, N. Y.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Whitney Chain Co., Hartford, Conn.

DRIVES, COOLING TOWER FAN

Cleveland Worm & Gear Co., Cleveland, O.
Doerr Electric Corp., Cedarburg, Wis.
Michigan Tool Co., Detroit, Mich.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.

DRIVES, FLAT BELT

See also Belting, Leather and Belting, Rubber

American Pulley Co., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Browning Mfg. Co., Inc., Maysville, Ky.
Caldwell Co., W. E., Louisville, Ky.
Chicago Belting Co., Chicago, Ill.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Dick Co., Inc., R. & J., Passaic, N. J.
Dodge Mfg. Corp., Mishawaka, Ind.
Ft. Worth Steel & Machinery Co., Ft. Worth, Tex.
Goodrich Co., B. F., Akron, O.
Medart Co., St. Louis, Mo.
Pyott Foundry & Machine Co., Chicago, Ill.
Rhoads & Sons, J. E., Philadelphia, Pa.
Williams & Son, I. B., Dover, N. H.
Wood's Sons Co., T. B., Chambersburg, Pa.

DRIVES, POWER FOR PIPE THREADING

Beaver Pipe Tools, Inc., Warren, O.
Ridge Tool Co., Elyria, O.
Toledo Pipe Threading Machine Co., Toledo, O.

DRIVES, V BELT

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Browning Mfg. Co., Inc., Maysville, Ky.
Chicago Belting Co., Chicago, Ill.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Congress Drives Div., Tann Corp., Detroit, Mich.
Dayton Rubber Co., Dayton, O.
Dick Co., Inc., R. & J., Passaic, N. J.
Dodge Mfg. Corp., Mishawaka, Ind.
Durkee-Atwood Co., Minneapolis, Minn.
Gates Rubber Co., The, Denver, Colo.
Goldens' Foundry & Machine Co., Columbus, Ga.
Goodrich Co., B. F., Akron, O.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Maurey Mfg. Corp., Chicago, Ill.
Medart Co., St. Louis, Mo.
Pyott Foundry & Machine Co., Chicago, Ill.
V-Belt Clutch Co., Los Angeles, Calif.
Wayne Manufacturing Co., Pomona, Calif.
Wood's Sons Co., T. B., Chambersburg, Pa.
Worthington Corp., Harrison, N. J.

DRIVES, VARIABLE SPEED

See Changers, Speed, Hydraulic Coupling; Changers, Speed, Mechanical; Reducers, Speed; Pulleys and Sheaves, for Belt Drives

DRYERS FOR COMPRESSED AIR

See Dehumidifiers for Compressed Air

DRYERS, INDUSTRIAL (COMPARTMENT, TUNNEL CONVEYOR, VACUUM, SPRAY, ROTARY, ETC.)

Air & Refrigeration Corp., New York, N. Y.
Biggs Boiler Works Co., The, E. Akron, O.
Bowen Engineering, Inc., North Branch, N. J.
Buflovak Equipment Div. of Blaw-Knox Co., Buffalo, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Drying Systems, Inc., Chicago, Ill.
Economy Equipment Co., Chicago, Ill.
Instant Drying Corp., New York, N. Y.
Jackson & Church Co., Saginaw, Mich. (Dryer for corn, grain, hops, and wood)
Kirk & Blum Mfg. Co., Cincinnati, O.
Link-Belt Co., Chicago, Ill.
Louisville Drying Machinery Unit, General American Transportation Corp., Louisville, Ky.
Mahr Mfg. Co., Div. of Diamond Iron Wks., Inc., Minneapolis, Minn.
Newcomb-Detroit Co., Detroit, Mich.
Peters-Dalton, Inc., Detroit, Mich.
Proctor & Schwartz, Inc., Philadelphia, Pa.
Raymond Div., Combustion Engineering Inc., Chicago, Ill.
Ross Engineering Corp., J. O., New York, N. Y.
Stokes Machine Co., F. J., Philadelphia, Pa.
Struthers Wells Corp., Titusville, Pa.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Western Precipitation Corp., Los Angeles, Calif.

DRYERS, REFRIGERANT

See Dehydrators, Refrigerant

DUAL THERMOSTATS

See Thermostats, Two Temperature or Dual

DUCT CONNECTIONS

See Connections, Duct, Flexible; Connectors for Non-Metallic Duct Fabrication

DUCT FURNACES

See Heaters, Duct

DUCT HEATERS

See Heaters, Duct

DUCT INSULATION

See Insulation, Duct

DUCT THERMOSTATS

See Thermostats, Duct Type

DUCT TURNING VANES

See Vanes, Duct Turning, Prefabricated

DUCTS AND DUCT FITTINGS, PREFABRICATED, METALLIC

Acer & Whedon, Inc., Medina, N. Y.
Acme Mfg. Co., Holmesburg, Philadelphia, Pa.
Adelta Mfg. Co., Inc., Philadelphia, Pa.
Ajax Furnace Fitting Co., Div. of Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
American Agile Corp., Bedford, O.
Buckeye Furnace Pipe Co., Columbus, O.
Champion Furnace Pipe Co., Peoria, Ill.
Char-Gale Mfg. Co., Minneapolis, Minn.
Chicago Furnace Supply Co., Chicago, Ill.
Clayton & Lambert Mfg. Co., Louisville, Ky.
Corbman Bros., Inc., Philadelphia, Pa.
Flexonics Corp., Maywood, Ill.
General Corporation, Minneapolis, Minn.
Gray Metal Products, Inc., Rochester, N. Y.
Heil Process Equipment Corp., Cleveland, O. (lined)
Henry Furnace Co., The, Medina, O.
Howes-Woods Co., Cambridge, Mass.
Inland Steel Products Co., Milwaukee, Wis.
International Heater Co., Utica, N. Y.
Jacobs Co., Inc., B. & J., Cincinnati, O.
Lennox Furnace Co., Marshalltown, Ia.
Littleford Bros., Inc., Cincinnati, O.
Lumm Co., A. H., Toledo, O.
Metal Fabricators, Inc., Charlotte, N. C.
Meyer & Bro. Co., F., Peoria, Ill.
Moncrief Furnace Co., Atlanta, Ga.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Ohio Valley Hardware & Roofing Co., Evansville, Ind.
Schecter Brothers Co., Philadelphia, Pa.
Sioux Steel Co., Sioux Falls, S. D.
Smith-Raymond Co., Columbus, Ga.
United States Register Co., Battle Creek, Mich.
Van Noorden Co., E. Boston, Mass.
Viking Mfg. Corp., Cleveland, O.
Waverly Heating Supply Co., Boston, Mass.
Williamson Heater Co., Cincinnati, O.

DUCTS AND DUCT FITTINGS, PREFABRICATED, NON-METALLIC

American Agile Corp., Bedford, O.
Arrowhead Rubber Co., Long Beach, Calif.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
du Pont de Nemours & Co., E. I., Fabrics & Finishes Dept., Wilmington, Del.
Excelsior Steel Furnace Co., The, Chicago, Ill.
Flexaust Co., New York, N. Y.
Flexible Tubing Corp., Guilford, Conn.
Haveg Corp., Newark, Del. (for fumes)
Heil Process Equipment Corp., Cleveland, O.
Jacobs Co., Inc., B. & J., Cincinnati, O.
Johns-Manville, New York, N. Y.
Knight, Maurice A., Akron, O. (also Permanite)
Lumm Co., A. H., Toledo, O.
Salt Mountain Co., Hamilton, O.
Smith-Raymond Co., Columbus, Ga.
Sonoco Products Co., Hartsville, S. C.
United States Rubber Co., New York, N. Y.

DYE PENETRANT

See Penetrant, Dye

DUST COLLECTORS

See Collectors, Dust

DUST COUNTERS

See Counters, Dust

ECONOMIZERS, FUEL

Babcock & Wilcox Co., New York, N. Y.
Combustion Engineering, Inc., New York, N. Y.
Edge Moor Iron Works, Inc., Edge Moor, Del.
Foster Wheeler Corp., New York, N. Y.
Green Fuel Economizer Co., Beacon, N. Y.
Richmond Engineering Co., Inc., Richmond, Va.
Springfield Boiler Co., Springfield, Ill.
Union Iron Works, Erie, Pa.

EJECTORS, SEWAGE

American-Marsh Pumps, Inc., Battle Creek, Mich.
Chicago Pump Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davidson Co., M. T., New York, N. Y.
Economy Pumps Inc., Div. of Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Nash Engineering Co., South Norwalk, Conn.
Penberthy Injector Co., Detroit, Mich.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Swaby Mfg. Co., Chicago, Ill.
Weil Pump Co., Chicago, Ill.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
Yeomans Bros. Co., Melrose Park, Ill.

ELBOWS, BALANCING, FOR HOT WATER HEATING SYSTEMS

Detroit Controls Corp., Detroit, Mich.
Dunham Co., C. A., Chicago, Ill.
G & H Mfg. Co., Philadelphia, Pa.
Hammond Brass Works, Hammond, Ind.
Kehm Corp., The, Chicago, Ill.
Reynolds Shaffer Co., Detroit, Mich.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.

ELECTRIC AIR CLEANERS

See Cleaners, Air, Electrical

ELECTRICAL RADIANT HEATING

See Conductors and Panels, Electrical, for Radiant Heating

ELECTRIC DRILLS

See Drills, Electric, Portable

ELECTRIC MOTORS

See Motors, Electric

ELECTRIC PIPE HEATING SYSTEMS

See Systems, Electric Pipe Heating

ELECTRIC SHEARS

See Shears, Electric, Portable

ELECTRIC UNIT HEATERS

See Heaters, Unit, Electric Heating Element

ELECTRIC WATER HEATERS

See Heaters, Water, Electric

ELECTRODES, ARC WELDING

Air Reduction Sales Co., New York, N. Y.
All-State Welding Alloys Co., Inc., White Plains, N. Y.

Allegheny Ludlum Steel Corp., Pittsburgh, Pa. (Stainless)
Allied Weld-Craft, Inc., Indianapolis, Ind.
Alloy Rods Co., York, Pa.
American Agile Corp., Bedford, O.
American Brass Co., Waterbury, Conn.
American Steel & Wire Div., United States Steel, Cleveland, O.
Arcos Corp., Philadelphia, Pa.
Crucible Steel Co. of America, Pittsburgh, Pa.
Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Harnischfeger Corp., Milwaukee, Wis.
Hobart Bros. Co., Troy, O.
International Nickel Co., Inc., The, New York, N. Y.
Laclede Steel Co., St. Louis, Mo.
Lincoln Electric Co., Cleveland, O.
Marquette Mfg. Co., Minneapolis, Minn.
Maurath, Inc., Cleveland, O.
McKay Co., Pittsburgh, Pa.
Metal & Thermit Corp., New York, N. Y.
Mir-O-Col Alloy Co., Inc., Los Angeles, Calif. (for hard facing)
National Carbon Co., Div. of Union Carbide & Carbon Corp., New York, N. Y.
National Cylinder Gas Co., Chicago, Ill.
Page Steel & Wire Division of American Chain & Cable Co., Inc., Monessen, Pa.
Sight Feed Generator Co., West Alexandria, O.
Smith Corp., A. O., Milwaukee, Wis.
Trindl Products, Ltd., Chicago, Ill.
Victor Equipment Co., Welding Equipment Div., San Francisco, Calif.
Westinghouse Electric Corp., Pittsburgh, Pa.

ELIMINATORS, AIR, FOR HEATING AND PIPING SYSTEMS

Anderson Co., V. D., The, Cleveland, O.
Armstrong Machine Works, Three Rivers, Mich.
Bell & Gossett Co., Morton Grove, Ill.
Dole Valve Co., The, Chicago, Ill.
Dunham Co., C. A., Chicago, Ill.
Gorton Heating Corp., Cranford, N. J.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Keeney Mfg. Co., Newington, Conn.
Livingstone Engineering Co., Worcester, Mass.
Maid-O'-Mist, Inc., Chicago, Ill.
Marsh Heating Equipment Co., Skokie, Ill.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Moreheat Distribution, Inc., Cincinnati, O.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Multiplex Mfg. Co., Berwick, Pa.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
Simplex Valve & Meter Co., Philadelphia, Pa.
Squires Co., C. E., The, Cleveland, O.
Taco Heaters, Inc., Providence, R. I.
Trane Co., The, La Crosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Wright-Austin Co., Detroit, Mich.

ENAMELS AND LACQUERS

Acme White Lead & Color Works, Detroit, Mich.
Acorn Refining Co., Cleveland, O.
American-Marietta Co., Chicago, Ill.
Arco Co., The, Cleveland, O.
Atlas Powder Co., North Chicago, Ill.
Baer Bros., New York, N. Y.
Barreled Sunlight Paint Co., Providence, R. I.
Blue Ridge Talc Co., Inc., Henry, Va.
Claronex Products, Inc., Brooklyn, N. Y.
Cordo Chemical Co., Norwalk, Conn.
Debevoise Co., The, Brooklyn, N. Y.
Devoe & Raynolds Co., Inc., New York, N. Y.
Dixon Crucible Co., Joseph, Jersey City, N. J.
du Pont de Nemours & Co. (Inc.) E. I., Fabrics & Finishes Dept., Wilmington, Del.
Hague & Co., Alfred, Brooklyn, N. Y.
Heresite & Chemical Co., Manitowoc, Wis.
Hilo Varnish Corp., Div. of Carpenter-Morton Co., Everett, Mass.
Horn Co., Inc., A. C., Long Island City, N. Y.
Inter-Coastal Paint Corp., East St. Louis, Ill.
Interchemical Corp., Finishes Div., Newark, N. J.
Irvington Varnish and Insulator Div. of Minnesota Mining & Mfg. Co., Irvington, N. J.
Knight, Maurice A., Akron, O.
Koppers Co., Inc., Pittsburgh, Pa.
Krehbiel Co., J. H., Chicago, Ill.
Mass & Waldstein Co., Newark, N. J.
Master Mechanics Co., Cleveland, O.
Midwest Products Co., Port Byron, Ill.
National Lead Co., New York, N. Y.
O'Brien Corp., The, South Bend, Ind.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Quigley Co., Inc., New York, N. Y.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Ronor Corp., Cleveland, O. (Spray units)
Rutland Fire Clay Co., Rutland, Vt.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Sherwin-Williams Co., The, Cleveland, O.
Sipe & Co., James B., Pittsburgh, Pa.
Sonneborn Sons, Inc., L., New York, N. Y.
Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga.
Thompson and Co., Oakmont, Pa.
Tropical Paint & Oil Co., Cleveland, O.
Truscon Laboratories, Detroit, Mich.
United Chromium, Inc., New York, N. Y.
Warren Refining & Chemical Co., The, Cleveland, O.
Watson-Standard Co., Pittsburgh, Pa.
Wilbur & Williams Co., Brighton, Mass.
Wilhelm Co., A., Reading, Pa.

ENCLOSURES FOR PERIMETER AIR CONDITIONING SYSTEMS AND AIR CONDITIONING UNITS

Hinrichsen, Inc., A. F., New York, N. Y.
National Sheet Metal Works, New York, N. Y.

ENCLOSURES, RADIATOR

Hendrick Mfg. Co., Carbondale, Pa.
Kauffman Air Conditioning Corp., St. Louis, Mo.

ENGINES, DIESEL, FOR FAN, PUMP AND COMPRESSOR DRIVES

American Locomotive Co., Schnectady, N. Y.
Anderson Diesel Engine Co., Philadelphia, Pa.
Baldwin-Lima-Hamilton Corp., Philadelphia, Pa.
Buda Co., Harvey, Ill.
Chicago Pneumatic Tool Co., New York, N. Y.
Continental Motors Corp., Muskegon, Mich.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Detroit Diesel Engine Div., General Motors Corp., Detroit, Mich.
Fairbanks, Morse & Co., Chicago, Ill.
Hill Diesel Engine Corp., Lansing, Mich.
Ingersoll-Rand Co., New York, N. Y.
Ready-Power Co., The, Detroit, Mich.
Synchro-Start Products, Inc., Skokie, Ill. (automatic controls to start, stop and protect internal combustion engines)
Waukesha Motors Co., Waukesha, Wis.
Witte Engine Works, Oil Well Supply Div., United States Steel Co., Kansas City, Mo.
Worthington Corp., Harrison, N. J.

ENGINES, GAS, FOR FAN, PUMP AND COMPRESSOR DRIVES

Buda Co., Harvey, Ill.
Chicago Pneumatic Tool Co., New York, N. Y.
Continental Motors Corp., Detroit, Mich.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Fairbanks Morse & Co., Chicago, Ill.
Ingersoll-Rand Co., New York, N. Y.
Ready-Power Co., The, Detroit, Mich.
Schramm, Inc., West Chester, Pa.
Synchro-Start Products, Inc., Skokie, Ill. (automatic controls to start, stop and protect internal combustion engines)
Waukesha Motor Co., Waukesha, Wis.
Witte Engine Works, Oil Well Supply Div., United States Steel Co., Kansas City, Mo.
Worthington Corp., Harrison, N. J.

ENGINES, STEAM, FOR FAN, PUMP AND COMPRESSOR DRIVES

Skinner Engine Co., Erie, Pa.
Troy Engine & Machine Co., Troy, Pa.
Vilter Mfg. Co., Milwaukee, Wis.
Wachs Co., E. H., The, Chicago, Ill.
Westinghouse Electric Corp., Pittsburgh, Pa.

EQUIPMENT, BALANCING

Bear Mfg. Co., Industrial Div., Rock Island, Ill.
Gisholt Machine Co., Madison, Wis.
Olsen Testing Machine Co., Tinius, Willow Grove, Pa.

EVAPORATIVE CONDENSERS

See Condensers, Refrigerating, Evaporative

EVAPORATIVE COOLERS

See Units, Air Conditioning, Summer, Evaporative Cooling Type

EVAPORATORS

See Chillers, Water

EXCHANGERS, HEAT

Adams Co., Inc., R. P., Buffalo, N. Y. (liquid to gas)
Aerco Corp., Englewood, N. J.
Aerofin Corp., Syracuse, N. Y.
Alstrom Corp., Bronx, N. Y.
Aluminum Co., of America, Pittsburgh, Pa.
American District Steam Co., Inc., North Tonawanda, N. Y.
American Locomotive Co., Alco Products Div., Dunkirk, N. Y.
Armstrong Co., Richard M., Westchester, Pa.
Bakeraire Corp., Inc., South Windham, Me.

Bell & Gossett Co., Morton Grove, Ill.
Biggs Boiler Wks., Co., The, E. Akron, O.
Binks Mfg. Co., Chicago, Ill.
Bowen Engineering, Inc., North Branch, N. J.
Brown Fintube Co., The, Elyria, O.
Bush Mfg. Co., West Hartford, Conn.
Cleaver-Brooks Co., Milwaukee, Wis.
Clifford Mfg. Co., Div. of Standard-Thomson Corp., Waltham, Mass.
Cochrane Corp., Philadelphia, Pa.
Coen Co., San Francisco, Calif.
Condenser Service & Engineering Co., Inc., Hoboken, N. Y.
Copper Boiler & Heater Wks., Manitowoc, Wis.
Corning Glass Works, Corning, N. Y.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Dahlquist Mfg. Co., Inc., Div. of Process Engineering Inc., Somerville, Mass.
Davis Engineering Corp., Elizabeth, N. J.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Downingtown Iron Works, Downingtown, Pa.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Drayer-Hanson, Inc., Los Angeles, Calif.
Drying Systems, Inc., Chicago, Ill.
Duriron Co., The, Dayton, O. (acid resisting)
Eastern Industries, Inc., New Haven, Conn.
Eclipse Fuel Engineering Co., Rockford, Ill.
Edwards Engineering Corp., Pompton Plains, N. J.
Electric Steel Foundry Co., Portland, Ore.
Fedders-Quigan Corp., Buffalo, N. Y.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
Fluor Corp., Ltd., The, Los Angeles, Calif.
Foster Wheeler Corp., New York, N. Y.
Frick Co., Waynesboro, Pa.
General Ceramics & Steatite Corp., Keasbey, N. J. (Impervious Graphite)
General Fittings Co., Providence, R. I.
General Heaters & Regulators Co., East Chicago, Ind.
Gilbert Brass Foundry Co., St. Louis, Mo.
Graham Mfg. Co., Inc., New York, N. Y.
Graver Water Conditioning Co., New York, N. Y.
Griscom-Russell Co., The, Massillon, O.
Heatron, Inc., York, Pa.
Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Heil Process Equipment Corp., Cleveland, O.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Joy Mfg. Co., Pittsburgh, Pa.
Kaiser Co., E. B., Glenview, Ill.
Kellogg Co., M. W., The, New York, N. Y.
Kenmore Machine Products, Inc., Lyons, N. Y.
Kewanee-Ross Corp., Kewanee, Ill.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Lindy Heaters, Inc., New York, N. Y.
Madden Corp., The, Chicago, Ill.
Manitowoc Shipbuilding, Inc., Manitowoc, Wis.
Manning & Lewis Engineering Co., Newark, N. J.
Marley Co., Inc., The, Kansas City, Mo.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Modine Mfg. Co., Racine, Wis.
Mueller Brass Co., Port Huron, Mich.
National Carbon Co., Div. of Union Carbide & Carbon Corp., New York, N. Y.
National Pipe Bending Co., New Haven, Conn.
National Radiator Co., The, Johnstown, Pa.
Niagara Blower Co., New York, N. Y.
Nooter Corp., St. Louis, Mo.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Perfex Corp., Milwaukee, Wis.
Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Quaid Fabrications, Inc., Philadelphia, Pa.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Reliable Products Mfg. Co., Brooklyn, N. Y.
Richmond Engineering Co., Inc., Richmond, Va.
Roessing Mfg. Co., Pittsburgh, Pa.
Rome-Turney Radiator Co., Rome, N. Y.
Schaub Engineering Co., Fred H., Chicago, Ill.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Sims Co., Erie, Pa.
Stout & Sons, David, St. Louis, Mo.
Struthers Wells Corp., Titusville, Pa.
Super Radiator Corp., St. Louis Park, Minneapolis, Minn.
Superior Combustion Industries, Inc., New York, N. Y.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Taco Heaters, Inc., Providence, R. I.
Techniflex Corp., Port Jervis, N. Y.
Terre Haute Boiler Works Co., Terre Haute, Ind.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, LaCrosse, Wis.
Tranter Mfg., Inc., Lansing, Mich.
Union Iron Works, Erie, Pa.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
United States Air Conditioning Corp., Minneapolis, Minn.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vapor Heating Corp., Chicago, Ill.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Westinghouse Electric Corp., Pittsburgh, Pa.
Whitlock Mfg. Co., Hartford, Conn.
Wilson Engineering Corp., Chicago, Ill.
Worthington Corp., Harrison, N. J.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.
Yula Water Heaters, Inc., New York, N. Y.

EXCHANGERS, HEAT, REFRIGERANT SUCTION LINE

Acme Industries, Inc., Jackson, Mich.
Armstrong Co., Richard M., Westchester, Pa.
Betz Corp., Hammond, Ind.
Blazer, M. & Son, Passaic, N. J.
Brown Fintube Co., The, Elyria, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davis Engineering Corp., Elizabeth, N. J.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Drayer-Hanson, Inc., Los Angeles, Calif.
Frick Co., Waynesboro, Pa.
Gerstein & Cooper Co., Inc., South Boston, Mass.
Heatron, Inc., York, Pa.
Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Kramer Trenton Co., Trenton, N. J.
Marlo Coil Co., St. Louis, Mo.
Mueller Brass Co., Port Huron, Mich.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Refrigeration Economics Co., Inc., Canton, O.
Super-Cold Corp., Los Angeles, Calif.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Techniflex Corp., Port Jervis, N. Y.
Temprite Products Corp., Birmingham, Mich.
Trane Co., The, La Crosse, Wis.
Vilter Mfg. Co., The, Milwaukee, Wis.
Wabash Mfg. Co., Chicago, Ill.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.

EXHAUST HEADS

See Heads, Exhaust, for Pipe Lines

EXHAUST VENTILATION FITTINGS

See Fittings, Exhaust, Garage, for Attaching Car Exhaust Pipe

EXHAUSTERS, WELDING FUME

Aladdin Heating Corp., San Leandro, Calif.
Allington & Curtis Mfg. Co., Saginaw, Mich.
American Blower Corp., Detroit, Mich.
American Machine Products Co., Marshalltown, Ia.
Ammerman Co., C. L., Minneapolis, Minn.
Bertram Co., Harvey P., The, Cincinnati, O.
Black Mfg. Co., Harrison, N. J.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Plainfield, N. J.
Chicago Blower Corp., Franklin Park, Ill.
Circulators & Devices Mfg. Corp., Brooklyn, N. Y.
Coppus Engineering Corp., Worcester, Mass.
Dana Fan & Blower Corp., Cincinnati, O.
Day Co., The, Minneapolis, Minn.
Emerson Electric Mfg. Co., The, St. Louis, Mo.
Gallaher Co., The, Omaha, Neb. & Owatonna, Minn.
General Blower Co., Morton Grove, Ill.
Jenn-Air Products Co., Indianapolis, Ind.
Kirk & Blum Mfg. Co., Cincinnati, O.
M & E Mfg. Co., Indianapolis, Ind.
Mine Safety Appliances Co., Pittsburgh, Pa.
Peters-Dalton, Inc., Detroit, Mich.
Ruemelin Mfg. Co., Milwaukee, Wis.
Torit Mfg. Co., St. Paul, Minn.
Utility Fan Corp., Los Angeles, Calif.
Wing Mfg. Co., L. J., Linden, N. J.
Wind-Way Fan & Ventilator Co., New Orleans, La.

EXPANDERS, TUBE

Airetool Mfg. Co., Springfield, O.
Chicago Pneumatic Tool Co., New York, N. Y.
Crane Packing Co., Chicago, Ill.
Key Co., East St. Louis, Ill.
Knuth Engineering Co., Chicago, Ill.
Talon Tools, Inc., North Arlington, N. J.
Vernon Tool Co., Ltd., Alhambra, Calif.
Wilson, Inc., Thomas C., Long Island City, N. Y.

EXPANSION BENDS

See Bends, Expansion

EXPANSION BOLTS

See Bolts, Expansion

EXPANSION JOINTS

See Joints, Pipe, Expansion

EXPANSION TANKS

See Tanks, Expansion, for Hot Water Heating Systems

EXPANSION VALVES

See Valves, Refrigeration

EXTRACTORS, PIPE

Chicago Specialty Mfg. Co., Chicago, Ill.
Greenfield Tap & Die Corp., Greenfield, Mass.
Reps Tool Co., Inc., Hartford, Conn.
Ridge Tool Co., Elyria, O.
Roddick Tool Co., Anaheim, Calif.
Walton Co., Hartford, Conn.

FABRICATED PIPING

See Bends; Headers; etc.

FABRICATORS, PIPE

See Headers, Pipe, Welded; and Coils, Pipe

FAN BALANCING EQUIPMENT

See Equipment, Balancing

FAN BASES

See Bases and Pads, Vibration Isolating

FAN BLADES

See Blades, Propeller Fan

FAN HOUSINGS

See Housings, Fan, Centrifugal

FANS, AXIAL FLOW, PRESSURE TYPE

Aerovent Fan Co., Inc., Piqua, O. (Tubeaxial and vaneaxial)
American Blower Corp., Detroit, Mich.
Bertram Co., Harvey P., The, Cincinnati, O.
Buffalo Forge Co., Buffalo, N. Y.
Chicago Blower Corp., Franklin Park, Ill. (tubeaxial)
Circulators & Devices Mfg. Corp., Brooklyn, N. Y. (vaneaxial)
De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Dynamic Air Engineering, Inc., Los Angeles, Calif.
General Blower Co., Morton Grove, Ill.
Hartzell Propeller Fan Co., Piqua, O.
Ilg Electric Ventilating Co., Chicago, Ill.
International Engineering Inc., Dayton, O.
Joy Mfg. Co., Pittsburgh, Pa. (vaneaxial)
Kody Blower Co., Trenton, N. J.
M & E Mfg. Co., Indianapolis, Ind.
Moore Co., The, Marceline, Mo. (vaneaxial)
Propellair Div., Robbins & Myers Inc., Springfield, O.
Robinson Ventilating Co., Zelionople, Pa.
South Bend Air Products, Inc., South Bend, Ind.
Stanat Mfg. Co., Long Island City, N. Y. (vaneaxial—2, 4 & 6 in diameter)
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wing Mfg. Co., L. J., Linden, N. J.

FANS, CENTRIFUGAL

Advance Aluminum Castings Corp., Chicago, Ill.
Advance Fan & Blower Co., Detroit, Mich.
Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
Airwasher Corp., Eaton Rapids, Mich.
Aladdin Heating Corp., San Leandro, Calif.
Allington & Curtis Mfg. Co., Saginaw, Mich.
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Blower Corp., Detroit, Mich.
American Foundry & Furnace Co., Bloomington, Ill.
American Machine Products Co., Marshalltown, Ia.
Ammerman Co., C. L., Minneapolis, Minn.
Bayley Blower Co., Milwaukee, Wis.
Bern's Mfg. Co., Chicago, Ill.
Bishop & Babcock Mfg. Co., Cleveland, O.
Blower Application Co., Milwaukee, Wis.
Brundage Co., The, Kalamazoo, Mich.
Buffalo Forge Co., Buffalo, N. Y.
Campbell Heating Co., Des Moines, Ia.
Campbell Co., E. K., Kansas City, Mo.
Carolina Blower Co., Inc., Greensboro, N. C.
Century Fan & Ventilator Co., Stamford, Conn.
Champion Blower & Forge Co., Lancaster, Pa.
Chicago Blower Corp., Franklin Park, Ill.
Circulators & Devices Mfg. Corp., Brooklyn, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
Coppus Engineering Corp., Worcester, Mass.
Day Co., The, Minneapolis, Minn.
Dayton Electric Mfg. Co., Chicago, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
Eastern Air Devices, Inc., Brooklyn, N. Y.
Eclipse Fuel Engineering Co, Rockford, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Ft. Worth Steel & Machinery Co., Ft. Worth, Tex.
Frigid, Inc., Brooklyn, N. Y.
Gallaher Co., The, Omaha, Neb.
Garden City Fan Co., Chicago, Ill.
General Blower Co., Morton Grove, Ill.
General Heating Products Co., Philadelphia, Pa.
Green Fuel Economizer Co., Beacon, N. Y.
Hartzell Propeller Fan Co., Piqua, O.
Hastings Air Conditioning Co., Hastings, Neb.
Ilg Electric Ventilating Co., Chicago, Ill.
Indiana Fan Company, Indianapolis, Ind.
International Sales Co., San Francisco, Calif.
Jackson & Church Co., Saginaw, Mich.
Jaden Mfg. Co., Hastings, Neb.
Jamieson Mfg. Co., Dallas, Tex.
Jeffrey Mfg. Co., Columbus, O.
Jenn-Air Products Co., Indianapolis, Ind.
King Co., The, Owatonna, Minn.
Lau Blower Co., Dayton, O.
Lehigh Fan & Blower Co., Allentown, Pa.
MaGirl Foundry & Furnace Co., Bloomington, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Wks., Inc., Minneapolis, Minn.
Martin Fan & Blower Co., Chicago, Ill.
Montag Stove & Furnace Wks., Portland, Ore.
Morrison Products Inc., Cleveland, O.
Motionair Co., Los Angeles, Calif.
Mountain States Equipment Co., Denver, Colo.
Mueller Furnace Co., L. J., Milwaukee, Wis.
National Engineering & Mfg. Co., Sedalia, Mo.
New York Blower Co., Chicago, Ill.
Newcomb-Detroit Co., Detroit, Mich.
Niagara Blower Co., New York, N. Y.
Northern Blower Co., Cleveland, O.
Palmer Mfg. Co., Phoenix, Ariz.
Peerless Electric Co., Warren, O.
Phelps Mfg. Co., Little Rock, Ark.
Prat-Daniel Corp., East Port Chester, Conn.
Reynolds Mfg. Co., The, Comstock Park, Mich.
Redmond Co., Inc., Owosso, Mich.
Revcor, Carpentersville, Ill.
Ripley Co., Inc., L-R Blower Div., Middletown, Conn.
Robinson Ventilating Co., Zelionople, Pa.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Schwitzer-Cummins Co., Indianapolis, Ind.
Small Motors, Inc., Chicago, Ill. (small sizes)
Standard Electric Mfg. Co., West Berlin, N. J.
Torrington Mfg. Co., The, Western Div., Van Nuys, Calif.
Trade-Wind Motorfans, Inc., Los Angeles, Calif.
Trane Co., The, LaCrosse, Wis.
United Electric Service Co., Wichita Falls, Tex.
United States Air Conditioning Corp., Minneapolis, Minn.
Utility Appliance Corp., Los Angeles, Calif.
Utility Fan Corp., Div. of Utility Appliance Corp., Los Angeles, Calif.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Whitty Co., Inc., Boston, Mass.

FANS, PROPELLER

Acme Equipment Co., Muskogee, Okla.
Aerovent Fan Co., Inc., Piqua, O.
Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
Air Equipment Co., Chicago, Ill.
Aire-Foile Fan & Blower Co., Detroit, Mich.
Airmaster Corp., Chicago, Ill.
Allen Ventilator Div., Production Planning Co., Rochester, Mich
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Blower Corp., Detroit, Mich.
American Coolair Corp., Jacksonville, Fla.
Baldor Electric Co., St. Louis, Mo.
Bar-Brook Mfg. Co., Inc., Shreveport, La.
Belter Electric Mfg. Co., G. J., The, St. Louis, Mo.
Bern's Mfg. Co., Chicago, Ill.
Bertram Co., Harvey P., The, Cincinnati, O.
Bishop & Babcock Mfg. Co., Cleveland, O.
Broan Mfg. Co., Inc., Milwaukee, Wis.
Bronson Fan Mfg. Co., Los Angeles, Calif.
Buffalo Forge Co., Buffalo, N. Y.
C & H Air Conditioning Fan Co., Inc., Atlanta, Ga.
Carling Turbine Blower Co., Worcester, Mass.
Century Fan & Ventilator Co., Stamford, Conn.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Plainfield, N. Y.
Chicago Blower Corp., Franklin Park, Ill.
Circulators & Devices Mfg. Corp., Brooklyn, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
Climax Machinery Co., Indianapolis, Ind.
Commercialaire, Inc., Brooklyn, N. Y.
Cook Co., Loren, Berea, O.
Coppus Engineering Corp., Worcester, Mass.
Dana Fan & Blower Corp., Cincinnati, O.
Dayton Electric Mfg. Co., Chicago, Ill.
De Bothezat Fans Div., American Machine & Metals, Inc., New York, N. Y.
DeVilbiss Co., The, Toledo, O.
Diehl Mfg. Co., Somerville, N. J.
Dual-Air Fan Co., South Elgin, Ill.
Dynamic Air Engineering, Inc., Los Angeles, Calif.
Eastern Air Devices, Inc., Brooklyn, N. Y.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Emerson Electric Mfg. Co., The, St. Louis, Mo.
Fasco Industries, Inc., Rochester, N. Y.
Frigid, Inc., Brooklyn, N. Y.
Gallaher Co., The, Omaha, Nebr.

General Blower Co., Morton Grove, Ill.
Guth Co., Edwin F., St. Louis, Mo.
Hartzell Propeller Fan Co., Piqua, O.
Holden Fan Co., Detroit, Mich.
Hunter Fan & Ventilating Co., Inc., Memphis, Tenn.
Ilg Electric Ventilating Co., Chicago, Ill.
Indiana Fan Co., Indianapolis, Ind.
International Engineering, Inc., Dayton, O.
Jamieson Mfg. Co., Dallas, Tex.
Jeffrey Mfg. Co., Columbus, O.
Jenn-Air Products Co., Indianapolis, Ind.
Jordan & Co., Inc., Paul R., Indianapolis, Ind.
Kernchen Co., Chicago, Ill.
King Co., The, Owatonna, Minn.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Kody Blower Co., Trenton, N. J.
Koppers Co., Inc., Metal Products Div., Baltimore, Md.
Lau Blower Co., Dayton, O.
M & E Mfg. Co., Indianapolis, Ind.
Martin Fan & Blower Co., Chicago, Ill.
McLarty Systems, Battle Creek. Mich.
Meier Electric & Machine Co., Inc., Indianapolis, Ind.
Moore Co., The, Marceline, Mo.
Motionair Co., Los Angeles, Calif.
Mountain States Equipment Co., Denver, Colo.
Muckle Mfg. Co., Owatonna, Minn.
Murray Co. of Texas, The, Atlanta, Ga.
Myers Electric Co., Inc., Pittsburgh, Pa.
National Engineering & Mfg. Co., Sedalia, Mo.
National Gas Equipment Co., Inc., Terrell, Tex.
New York Blower Co., Chicago, Ill.
Peerless Electric Co., Warren, O. (Disc)
Perkins & Son, Inc., B. F., Holyoke, Mass.
Phelps Mfg. Co., Little Rock, Ark.
Pritchard & Co., J. F., Kansas City, Mo.
Propellair Div., Robbins & Myers, Inc., Springfield, O.
Reed Unit-Fans, Inc., New Orleans, La.
Reynolds Electric Co., River Grove, Ill.
Rich Fan Mfg. Co., Inc., Phil, Houston, Texas
Robbins & Myers, Inc., Fan Div., Memphis, Tenn.
Robinson Ventilating Co., Zelionople, Pa.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Schwitzer-Cummins Co., Indianapolis, Ind.
Signal Electric Mfg. Co., Menominee, Mich.
Somers, Inc., H. J., Detroit, Mich.
South Bend Air Products, Inc., South Bend, Ind.
Standard Electric Mfg. Co., West Berlin, N. J.
Sutton Corp., O. A., The, Wichita, Kan.
Swift Mfg. Co., Inc., Hazel Park, Mich.
Thermal Industries, Indio, Calif.
Trade-Wind Motorfans, Inc., Los Angeles, Calif.
Trane Co., The, LaCrosse, Wis.
Truflow Fan Co., Harmony, Pa.
United Electric Service Co., Wichita Falls, Tex.
United States Air Conditioning Corp., Minneapolis, Minn.
Universal Industrial Propeller Co., Stamford, Conn.
Western Blower Co., Seattle, Wash.
Western Engineering & Mfg. Co., Venice, Calif.
Wind-Way Fan & Ventilating Co., New Orleans, La.
Wing Mfg. Co., L. J., Linden, N. J.

FASTENERS, INSULATION

Acme Steel Co., Chicago, Ill. (steel strapping)
Devices, Inc., New York, N. Y.
Gerrard & Co., A. J. Melrose Park, Ill.
Lexsuco, Inc., Cleveland, O.
Moore, Inc., Goodloe, E., Danville, Ill.
Miracle Adhesives Corp., New York, N. Y.
Nelson Stud Welding Div., Gregory Industries Inc., Lorain, O.
Presstite Engineering Co., St. Louis, Mo.
Ramset Div., Olin Industries, Inc., Cleveland, O. (powder-actuated)
Stic-Klip Mfg. Co., Inc., Cambridge, Mass.
Tinnerman Products, Inc., Cleveland, O.

FEEDERS, CHEMICAL, PROPORTIONING

American Water Softener Co., Philadelphia, Pa.
Belco Industrial Equipment Div., Inc., Paterson, N. J.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Bogue Electric Co., Paterson, N. J.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Cochrane Corp., Philadelphia, Pa.
Dearborn Chemical Co., Chicago, Ill.
Elgin Softener Corp., Elgin, Ill.
Fischer & Porter Co., Hatboro, Pa.
Fuller Co., Catasauqua, Pa.
Graver Water Conditioning Co., New York, N. Y.
Haering & Co., Inc., D. W., San Antonio, Tex.
Hungerford & Terry, Inc., Clayton, N. J.
Jeffrey Mfg. Co., Columbus, O.
Madden & Co., P. E., Chicago, Ill.
Milton Roy Co., Philadelphia, Pa.
Myers & Bros. Co., F. E., The, Ashland, O.
National Aluminate Corp., Chicago, Ill.
Omega Machine Co., Div. of Builders Iron Foundry, Providence, R. I.
% Proportioneers, Inc. %, Providence, R. I.
Paddock Engineering Co., of Texas, Dallas, Tex.
Permutit Co., New York, N. Y.
Precision Machine Co., Somerville, Mass.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Syntron Co., Homer City, Pa.
Wallace & Tiernan Co., Inc., Newark, N. J.

FEEDERS, WATER, HEATING BOILER

Bailey Co., Chas. M., San Francisco, Calif.
Campbell Co., J. A., Long Beach, Calif.
Cissell Mfg. Co., Inc., W. M., Louisville, Ky.
Davis Regulator Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Jacuzzi Bros., Inc., Richmond, Calif.
Kieley & Mueller, Inc., Middletown, N. Y.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Magnetrol, Inc., Chicago, Ill.
Maid-O'-Mist, Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Morehead Mfg. Co., Detroit, Mich.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Nason Co., Clarkston, Mich.
Newark Controls Co., Bloomfield, N. J.
Penn Controls, Inc., Goshen, Ind.
Schaub Engineering Co., Fred H., Chicago, Ill.
Watts Regulator Co., Lawrence, Mass.
Webster & Co., Warren, Camden, N. J.

FEEDWATER HEATERS

See Deaerators

FIBER PACKING

See Packing, Fiber

FIBER PIPE

See Pipe, Fiber

FILTER GAGES

See Gages, Air Filter

FILTERS, AIR, AUTOMATIC

Air-Maze Corp., Cleveland, O.
Air-Stream Filter Corp., St. Louis, Mo.
American Air Filter Co., Inc., Louisville, Ky.
Bahnson Co., Winston-Salem, N. C.
Continental Air Filters, Inc., Louisville, Ky.
Dollinger Corp., Rochester, N. Y.
Farr Co., Los Angeles, Calif.
Ruemelin Mfg. Co., Milwaukee, Wis.

FILTERS, AIR, ELECTRIC

See Cleaners, Air, Electrical

FILTERS, AIR, GREASE

Air Devices, Inc., New York, N. Y.
Air Filter Corp., Milwaukee, Wis.
Air-Maze Corp., Cleveland, O.
American Air Filter Co., Inc., Louisville, Ky.
Continental Air Filters, Inc., Louisville, Ky.
Dollinger Corp., Rochester, N. Y.
Evans Corp., The, George, Moline, Ill.
Farr Co., Los Angeles, Calif.
Filtair Mfg. Co., San Francisco, Calif.
Research Products Corp., Madison, Wis.
Smith Filter Corp., Moline, Ill.

FILTERS, AIR, UNIT, CLEANABLE

Air Devices, Inc., New York, N. Y.
Air Filter Corp., Milwaukee, Wis.
Air-Maze Corp., Cleveland, O.
Air-Stream Filter Corp., St. Louis, Mo.
Aluminum Wool Div., Carey Electronic Engineering Co., Springfield, O.
American Air Filter Co., Inc., Louisville, Ky.
Annis Air Filter Div., Royal Heaters, Inc., Alhambra, Calif.
Bard Mfg. Co., Bryan, O.
Carey Electronic Engineering Co., Metal Wool Div., Springfield, O.
Continental Air Filters, Inc., Louisville, Ky.
Coppus Engineering Corp., Worcester, Mass.
Dollinger Corp., Rochester, N. Y.
Evans Corp., The, George, Moline, Ill.
Farr Co., Los Angeles, Calif.
Goodyear Tire & Rubber Co., Akron, O. (electrostatic)
Kauffman Air Conditioning Corp., St. Louis, Mo.
Research Products Corp., Madison, Wis.
Somers, Inc., H. J., Detroit, Mich.
Smith Filter Corp., Moline, Ill.

FILTERS, AIR, UNIT, RENEWABLE MEDIA

Air-Maze Corp., Cleveland, O.
American Air Filter Co., Inc., Louisville, Ky.
American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Annis Air Filter Div., Royal Heaters, Inc., Alhambra, Calif.
Continental Air Filters, Inc., Louisville, Ky.
Dollinger Corp., Rochester, N. Y.
Glasfloss, New York, N. Y.
Himelblau Associates, Inc., Chicago, Ill.
Research Products Corp., Madison, Wis.

FILTERS, AIR, UNIT, THROW-AWAY

American Air Filter Co., Inc., Louisville, Ky.
Beck Mfg. Co., New Albany, Ind. (Special sizes)
Cambridge Corp., Syracuse, N. Y.
Drico Industrial Corp., New York, N. Y.
Glasfloss, New York, N. Y.
Himelblau Associates, Inc., Chicago, Ill.
Mine Safety Appliances Co., Pittsburgh, Pa.
Owens-Corning Fiberglas Corp., Toledo, O.
Research Products Corp., Madison, Wis.
Wilson & Co., Inc., Chicago, Ill.

FILTERS, AIR, UNIT, TREATED WITH ODOR REMOVING COMPOUNDS

Research Products Corp., Madison, Wis.

FILTERS FOR OIL BURNERS

A-P Controls Corp., Milwaukee, Wis.
Andale Co., Philadelphia, Pa.
Commercial Filters Corp., Melrose, Mass.
Cuno Engineering Corp., Meriden, Conn.
Eddington Metal Specialty Co., Eddington, Pa.
Fano-Flame Oil Burner Corp., Huntington Park, Calif.
Fram Corp., Providence, R. I.
General Filters, Inc., Novi, Mich.
Marquart Mfg. Co., Oakland, Calif.
Meldon Industries Div., Tool Industries, Inc., Detroit, Mich.
Morse-Smith-Morse Co., The, Watertown, Mass.
Purolator Products, Inc., Rahway, N. J.
Rega Mfg. Co., Rochester, N. Y.
Sparkler Mfg. Co., Mundelein, Ill.
Unifilter Co., Farmington, Mich.
W. G. B. Oil Clarifier, Inc., Kingston, N. Y.

FILTERS, ODOR

See Adsorbers, Odor

FILTERS, PIPE LINE

Adams Co., Inc., R. P., Buffalo, N. Y.
Air Conversion Research Corp., Chicago, Ill.
Air-Line Engineering Co., Mansfield, Ohio
Air-Maze Corp., Cleveland, Ohio.
Alco Valve Co., St. Louis, Mo.
American Air Filter Co., Inc., Louisville, Ky.
American Cyanamid & Chemical Corp., New York, N. Y.
American Locomotive Co., Alco Products Div., Dunkirk, N. Y.
Andale Co., Philadelphia, Pa.
Anderson Co., V. D., The, Cleveland, O.
Bowser, Inc., Fort Wayne, Ind.
CCA Products, Inc., Glendale, Calif.
Champion Laboratories, Inc., Meriden, Conn.
Cleveland Humidifier Co., Cleveland, O.
Commercial Filters Corp., Melrose, Mass.
Conoflow Corp., Philadelphia, Pa.
Cuno Engineering Corp., Meriden, Conn.
DeVilbiss Co., The, Toledo, O.
Dollinger Corp., Rochester, N. Y.
Eddington Metal Specialty Co., Eddington, Pa.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
Fisher Governor Co., Marshalltown, Ia.
Fram Corp., Providence, R. I.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
General Filters, Inc., Novi, Mich.
Johnson Corp., The, Three Rivers, Mich.
Kaye & MacDonald, Inc., West Orange, N. J.
Kraissl Co., Inc., The, Hackensack, N. J.
Marvel Engineering Co., Chicago, Ill.
Micro Metallic Corp., Glen Cove, N. Y.
Moraine Products Div., General Motors Corp., Dayton, O. (Porous metal)
Newark Wire Cloth Co., Newark, N. J.
Norgren Co., C. A., Englewood, Colo.
Norwalk Valve Co., South Norwalk, Conn.
Patrol Valve Co., The, Cleveland, O.
Porous Plastic Filter Co., Glen Cove, N. Y.
Rega Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Selas Corp. of America, Philadelphia, Pa.
Sparkler Mfg. Co., Mundelein, Ill.
Standard Machine & Mfg. Co., St. Louis, Mo.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Trerice Co., Detroit, Mich.
Tri-Clover Machine Co., Kenosha, Wis.
Warner Lewis Co., Tulsa, Okla.
Winslow Engineering Co., Oakland, Calif.
Worthington Corp., Harrison, N. J.

FILTERS, REFRIGERANT

A-P Controls Corp., Milwaukee, Wis.
Alco Valve Co., St. Louis, Mo.
American Locomotive Co., Alco Products Div., Dunkirk, N. Y.
Commercial Filters Corp., Melrose, Mass.
Dollinger Corp., Rochester, N. Y.
Eddington Metal Specialty Co., Eddington, Pa.
General Filter Co., Ames, Ia.
Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Kenmore Machine Products, Inc., Lyons, N. Y.
McIntire Co., The, Newark, N. J.
Moraine Products Div., General Motors Corp., Dayton, O. (Porous metal)
Mueller Brass Co., Port Huron, Mich.
Newark Wire Cloth Co., Newark, N. J.
Penn Controls, Inc., Goshen, Ind.
Phillips & Co., H. A., Chicago, Ill.
Porous Plastic Filter Co., Glen Cove, N. Y.
Remco, Inc., Zelienople, Pa.
Sealed Unit Parts Co., Inc., Bronx, N. Y.
Sporlan Valve Co., St. Louis, Mo.
Standard Machine & Mfg. Co., St. Louis, Mo.
Vilter Mfg. Co., The, Milwaukee, Wis.
Wabash Mfg. Co., Chicago, Ill.

FILTERS, WATER

Adams Co., Inc., R. P., Buffalo, N. Y.
Alco Valve Co., St. Louis, Mo.
American Cyanamid & Chemical Corp., New York, N. Y.
American Locomotive Co., Alco Products Div., Dunkirk, N. Y.
American Water Softener Co., Philadelphia, Pa.
American Well Works, Aurora, Ill.
Andale Co., Philadelphia, Pa.
Aqua-Mist Co., Topeka, Kan. (Aspenwood fibre)
Belco Industrial Equipment Div., Inc., Paterson, N. J.
Bowser, Inc., Fort Wayne, Ind.
Bruner Corp., Milwaukee, Wis.
Cochrane Corp., Philadelphia, Pa.
Commercial Filters Corp., Melrose, Mass.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cuno Engineering Corp., Meriden, Conn.
Dollinger Corp., Rochester, N. Y.
Duro Co., Dayton, O.
Eddington Metal Specialty Co., Eddington, Pa.
Elgin-Refinite, Div. of Elgin Softener Corp., Elgin, Ill.
Elgin Softener Corp., Elgin, Ill.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
Fram Corp., Providence, R. I.
Graver Water Conditioning Co., New York, N. Y.
Greer Hydraulics, Inc., Brooklyn, N. Y.
Henry Valve Co., Melrose Park, Ill.
Hungerford & Terry, Inc., Clayton, N. J.
Kaye & MacDonald, Inc., West Orange, N. J.
Marvel Engineering Co., Chicago, Ill.
Micro Metallic Corp., Glen Cove, N. Y.
Newark Wire Cloth Co., Newark, N. J.
Norwood Associated Engineers Inc., Springfield, Mass.
% Proportioneers, Inc. %, Providence, R. I.
Permutit Co., New York, N. Y.
Porous Plastic Filter Co., Glen Cove, N. Y.
Research Products Corp., Madison, Wis.
Reynolds Shaffer Co., Detroit, Mich.
Stover Water Softener Co., St. Charles, Ill.
Uniflow Mfg. Co., Erie, Pa.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Winslow Engineering Co., Oakland, Calif.
Worthington Corp., Harrison, N. J.

FINNED TUBING

See Tubing, Finned

FIRE EXTINGUISHING SYSTEMS

See Systems, Fire Extinguishing

FIRE PUMPS

See Pumps, Fire

FITTINGS, BLOW PIPE

Ajax Furnace Fitting Co., Div. of Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Allington & Curtis Mfg. Co., Saginaw, Mich.
American Blow Pipe Co., Chicago, Ill.
American Locomotive Co., Alco Products Div., Dunkirk, N. Y.
Carolina Blower Co., Inc., Greensboro, N. C.
Chicago Metal Mfg. Co., Chicago, Ill.
Day Co., The, Minneapolis, Minn.
Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Griffin & Co., Louisville, Ky.
Indiana Fan Co., Indianapolis, Ind.
Kirk & Blum Mfg. Co., Cincinnati, O.
National Metal Fabricators, Chicago, Ill.
Newcomb-Detroit Co., Detroit, Mich.
Northern Blower Co., Cleveland, O.
Peters-Dalton, Inc., Detroit, Mich.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
St. Louis Blow Pipe & Heater Co., Div. of Young Sales Corp., St. Louis, Mo.
Schmieg Industries, Detroit, Mich.
Tiffin Eaves Trough Clamp Co., Tiffin, O.
Torit Mfg. Co., St. Paul, Minn.
United States Register Co., Battle Creek, Mich.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.
Young & Bertke Co., Cincinnati, O.

FITTINGS AND BUSHINGS, FUEL OIL TANK

Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Mel-Gauge Co., New Haven, Conn.

Universal Valve Co., Elizabeth, N. J.
U. S. Plug & Fitting Co., Wellington, O.
Ward Foundries, Inc., J. P., Blossburgh, Pa.

FITTINGS FOR CENTRAL VACUUM CLEANING SYSTEMS

H-P Products, Inc., Louisville, O.

FITTINGS, COPPER TUBE, COMPRESSION

Acheson Mfg. Co., Rankin, Pa.
Aircraft Fittings Co., Cleveland, O.
American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Forging and Mfg. Co., Chicago, Ill.
Commonwealth Brass Corp., Detroit, Mich.
Couplings Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Everhot Products Co., Chicago, Ill.
Hays Mfg. Co., Erie, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Lunkenheimer Co., Cincinnati, O.
Madden Brass Products Co., Chicago, Ill.
Oil Equipment Mfg. Corp., New Haven, Conn.
Parker Appliance Co., The, Cleveland, O.
Scovill Mfg. Co., Waterville Div., Waterville, Conn.
Wabash Mfg. Co., Chicago, Ill.
Weatherhead Co., Cleveland, O.

FITTINGS, COPPER TUBE, FLARED

Acheson Mfg. Co., Rankin, Pa.
Aircraft Fitting Co., Cleveland, O.
American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
Couplings Co., Chicago, Ill.
Everhot Products Co., Chicago, Ill.
Grinnell Co., Inc., Providence, R. I.
Hays Mfg. Co., Erie, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lunkenheimer Co., Cincinnati, O.
Madden Brass Products Co., Chicago, Ill.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Oil Equipment Mfg. Corp., New Haven, Conn.
Parker Appliance Co., The, Cleveland, O.
Phoenix Brass Fittings Corp., Irvington, N. J.
Remco, Inc., Zelienople, Pa.
Scovill Mfg. Co., Waterville Div., Waterville, Conn.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Truetite Corp., The Bridgeport, Conn.
Union Malleable Mfg. Co., Ashland, O.
Wabash Mfg. Co., Chicago, Ill.
Weatherhead Co., Cleveland, O.

FITTINGS, COPPER TUBE, SOLDER

Acheson Mfg. Co., Rankin, Pa.
American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
General Fittings Co., Providence, R. I.
Grabler Mfg. Co., Cleveland, O.
Hammond Brass Works, Hammond, Ind.
Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Phoenix Brass Fittings Corp., Irvington, N. J.
Union Malleable Mfg. Co., Ashland, O.
Walworth Co., New York, N. Y. (Brazed)

FITTINGS, DRAINAGE, FIXED AIR BREAK

Crane Co., Chicago, Ill.

FITTINGS, EXHAUST, GARAGE, FOR ATTACHING CAR EXHAUST PIPE

Ammerman Co., C. L., Minneapolis, Minn.
Kent-Moore Organization, Detroit, Mich.
Wendt Co., O. A., Chicago, Ill.

FITTINGS, HOSE TO PIPE

Allen Mfg. Co., W. D., Chicago, Ill.
Weatherhead Co., The, Cleveland, O.

FITTINGS, HOT WATER HEATING SYSTEMS, ONE PIPE

Acheson Mfg. Co., Rankin, Pa.
Autostributor Co., Lansing, Mich. (manifold for connecting radiator branches)
Bell & Gossett Co., Morton Grove, Ill.
Dunham Co., C. A., Chicago, Ill.
General Heaters & Regulators Co., East Chicago, Ind.
Hi-Flow Products, Inc., Lindenhurst, N. Y.
Kehm Corp., The, Chicago, Ill.
Mel Products Co., The, New Haven, Conn.
Quality Specialty Co., Inc., Camden, N. J.
Sall Bros. Co., Rockford, Ill.
Sullivan Valve & Engineering Co., Butte, Mont.
Taco Heaters, Inc., Providence, R. I.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, LaCrosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.

FITTINGS, LIFT

Sarcotherm Controls, Inc., New York, N. Y.
Webster & Co., Warren, Camden, N. J.

FITTINGS, LINED

American Hard Rubber Co., New York, N. Y. (Rubber)
Bart Mfg. Corp., Belleville, N. J.
Cement Lined Pipe Co., Lynn, Mass. (Lead and tin)
Division Lead Co., Summit, Ill.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Gates Engineering Co., Wilmington, Del.
Goodrich Co., B. F., Akron, O. (Rubber)
Heil Process Equipment Corp., Cleveland, O.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead and tin)
Marquette Coppersmithing Co., Philadelphia, Pa.
Michigan Pipe Co., Bay City, Mich. (Wood, saran rubber)
National Lead Co., New York, N. Y. (Lead)
Northern Indiana Brass Co., Elkhart, Ind. (Tinned)
Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber)
Resisto Pipe & Valve Co., East Cambridge, Mass. (lead)
Saran Lined Pipe Co., Ferndale, Mich.
United States Rubber Co., New York, N. Y. (Rubber)
Warren Foundry & Pipe Corp., New York, N. Y. (cement)

FITTINGS, PIPE, ALUMINUM

Aircraft Fitting Co., Cleveland, O.
Aluminum Co. of America, Pittsburgh, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Ladish Co., Cudahy, Wis.
Robinson Corp., Roselle Park, N. J.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tube Turns, Inc., Louisville, Ky.
Welding Fittings Corp., New Castle, Pa.

FITTINGS, PIPE, BRASS, THREADED

Acheson Mfg. Co., Rankin, Pa.
Aircraft Fitting Co., Cleveland, O.
American Manganese Bronze Co., Philadelphia, Pa.
Bowser, Inc., Fort Wayne, Ind.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
Couplings Co., The, Chicago, Ill.
Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Gilbert Brass Foundry Co., St. Louis, Mo.
Grinnell Co., Inc., Providence, R. I.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Ladish Co., Cudahy, Wis.
Madden Brass Products Co., Chicago, Ill.
New York Brass Fdry., New York, N. Y.
Parker Appliance Co., Cleveland, O.
Penn Mfg. Corp., of Washington, Pa., Washington, Pa.
Phoenix Brass Fittings Corp., Irvington, N. J.
U. S. Plug & Fitting Co., Wellington, O. (pipe plugs)
Union Metal Wks., Chelsea, Mass.
Walworth Co., New York, N. Y.
Weatherhead Co., The, Cleveland, O.

FITTINGS, PIPE, BRASS, WELDING

Chase Brass & Copper Co., Waterbury, Conn.
Ladish Co., Cudahy, Wis.
Midwest Piping Co., Inc., St. Louis, Mo.
Robinson Corp., Roselle Park, N. J.
Tube Turns, Inc., Louisville, Ky.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Walworth Co., New York, N. Y. (Brazed)

FITTINGS, PIPE, BRONZE, BRAZED

American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Union Metal Works, Chelsea, Mass.
Walworth Co., New York, N. Y.

FITTINGS, PIPE, BRONZE, SOLDER

Acheson Mfg. Co., Rankin, Pa.
American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Crane Co., Chicago, Ill.
Everhot Products Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
General Fittings Co., Providence, R. I.
Gilbert Brass Foundry Co., St. Louis, Mo.
Grabler Mfg. Co., Cleveland, O.
Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
Mueller Brass Co., Port Huron, Mich.

Northern Indiana Brass Co., Elkhart, Ind.
Union Malleable Mfg. Co., Ashland, O.
Union Metal Works, Chelsea, Mass.

FITTINGS, PIPE, CAST IRON, FLANGED

Alabama Pipe Co., Anniston, Ala.
American Cast Iron Pipe Co., Birmingham, Ala.
Clow & Sons, James B., Chicago, Ill.
Crane Co., Chicago, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
Frick Co., Waynesboro, Pa.
Grinnell Co., Inc., Providence, R. I.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kuhns Bros. Co., Dayton, O.
Malleable Iron Fittings Co., Branford, Conn.
National Valve & Mfg. Co., Pittsburgh, Pa.
Parks-Cramer Co., Fitchburg Mass. (Jacketed)
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Stockham Valves & Fittings, Birmingham, Ala.
Straight Line Foundry & Machine Corp., Direct Separator Div., The, Syracuse, N. Y.
Vilter Mfg. Co., The, Milwaukee, Wis.
Walworth Co., New York, N. Y.
Warren Foundry & Pipe Corp., New York, N. Y.
York Corp., York, Pa.

FITTINGS, PIPE, CAST IRON, THREADED

Clow & Sons, James B., Chicago, Ill.
Crane Co., Chicago, Ill.
Detroit Brass & Malleable Wks., Detroit, Mich.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Frick Co., Waynesboro, Pa.
Grabler Mfg. Co., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kuhns Bros. Co., Dayton, O.
Malleable Iron Fittings Co., Branford, Conn.
Ravena Iron Co., Ravena, N. Y.
Somerville Iron Works, Somerville, N. J.
Stockham Valves & Fittings, Birmingham, Ala.
U. S. Plug & Fitting Co., Wellington, O. (pipe plug)
Union Malleable Mfg. Co., Ashland, O.
Vilter Mfg. Co., The, Milwaukee, Wis.
Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Zurn Mfg. Co., J. A., Erie, Pa.
York Corp., York, Pa.

FITTINGS, PIPE, COMPRESSION

Aircraft Fitting Co., Cleveland, O.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Hays Mfg. Co., Erie, Pa.
Quik Joint Mfg. Co., Harvey, Ill.

FITTINGS, PIPE, HARD RUBBER

American Hard Rubber Co., New York, N. Y.
Goodrich Co., B. F., Akron, O.
Luzerne Rubber Co., Trenton, N. J.
Stokes Molded Products, Inc., Trenton, N. J.
United States Rubber Co., New York, N. Y.
Vanton Pump & Equipment Corp., New York, N. Y.

FITTINGS, PIPE, LEAD

Alpha Metals, Inc., Jersey City, N. J.
Division Lead Co., Summit, Ill.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Flemm Lead Co., Inc., Long Island City, N. Y.
Gardiner Metal Co., Chicago, Ill.
Heil Process Equipment Corp., Cleveland, O.
Lead Lined Iron Pipe Co., Wakefield, Mass.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
National Lead Co., New York, N. Y.
Northwest Lead Co., Seattle, Wash.
Resisto Pipe & Valve Co., East Cambridge, Mass.
Rochester Lead Works, Inc., Rochester, N. Y.
Tube Turns, Inc., Louisville, Ky.

FITTINGS, PIPE, MALLEABLE

Corley Co., Inc., The, Jersey City, N. J.
Crane Co., Chicago, Ill.
Detroit Brass & Malleable Wks., Detroit, Mich.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Grabler Mfg. Co., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki, Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Malleable Iron Fittings Co., Branford, Conn.
Pacific Fittings Div., General Metals Corp., Hollydale, Calif.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Rhode Island Fittings Co., Providence, R. I.
Stockham Valves & Fittings, Birmingham, Ala.
U. S. Plug & Fitting Co., Wellington, O. (pipe plugs)
Union Malleable Mfg. Co., Ashland, O.
Union Pipe Fitting Co., Fort Atkinson, Wis.
Vilter Mfg. Co., The, Milwaukee, Wis.
Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.

FITTINGS, PIPE, MALLEABLE, BRAZED

Flagg & Co., Inc., Stanley G., Philadelphia, Pa.

FITTINGS, PIPE, NICKEL AND NICKEL ALLOY

American Manganese Bronze Co., Philadelphia, Pa.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Hasco Valve & Machine Co., Milwaukee, Wis.
International Nickel Co., Inc., The, New York, N. Y.
Ladish Co., Cudahy, Wis.
Parks-Cramer Co., Fitchburg, Mass. (jacketed)
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Robinson Corp., Roselle Park, N. J.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tri-Clover Machine Co., Kenosha, Wis.
Tube Turns, Inc., Louisville, Ky.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Walworth Co., New York, N. Y.
Warren Foundry & Pipe Corp., New York, N. Y.
Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.
Welding Fittings Corp., New Castle, Pa.

FITTINGS, PIPE, PLASTIC

Acadia Synthetic Products Div., Western Felt Works, Chicago, Ill.
Alpha Plastics, Inc., W. Orange, N. J.
American Agile Corp., Bedford, O.
American Hard Rubber Co., New York, N. Y.
Aqua-Therm, Inc., Dayton, O.
Commercial Plastics Co., Chicago, Ill.
Continental-Diamond Fibre Co., Newark, Del.
Flexrock Co., Philadelphia, Pa.
General Ceramics & Steatite Corp., Keasbey, N. J.
Hartwell & Son, Inc., H. N., Boston, Mass.
Haveg Corp., Newark, Del.
Manufacturers Corp., Mansfield, O.
Mills Corp., Elmer E., Chicago, Ill.
New York Belting & Packing Co., Passaic, N. J.
North Penn Co., New York, N. Y.
Protective Closures Co., Inc., Buffalo, N. Y. (cap and plug closures)
Republic Steel Corp., Cleveland, O.
Richland Co., Mansfield, O.
Saran Lined Pipe Co., Ferndale, Mich.
Skyline Industries, Titusville, Pa.
Triangle Conduit & Cable Co., Plastic Products Div., Inc., New Brunswick, N. J.
United States Stoneware Co., New York, N. Y.
Vanton Pump & Equipment Corp., New York, N. Y.
Yardley Plastics Co., Columbus, O.

FITTINGS, PIPE, SADDLE TEE

Ladish Co., Cudahy, Wis.
Skinner Co., M. B., South Bend, Ind.
Taylor Forge & Pipe Works, Chicago, Ill.
Tube Turns, Inc., Louisville, Ky.

FITTINGS, PIPE, SANITARY

Acheson Mfg. Co., Rankin, Pa.
Duriron Co., Inc., The, Dayton, O. (corrosion resisting)
Stockham Valves & Fittings, Birmingham, Ala.
Tri-Clover Machine Co., Kenosha, Wis.

FITTINGS, PIPE, SPECIAL FOR BASEBOARD RADIATION

Fabri-Valve Co. of America, Portland, Ore.
General Fittings Co., Providence, R. I., (special tee)
Hi-Flow Products, Inc., Lindenhurst, N. Y.
Northern Indiana Brass Co., Elkhart, Ind.
Rittling Corp., The, Buffalo, N. Y.

FITTINGS, PIPE, STAINLESS STEEL

Aircraft Fitting Co., Cleveland, O.
Alloy Stainless Products Co., Totowa, N. J.
Camco Products Inc., North Haven, Conn.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Frasse & Co., Peter A., New York, N. Y.
Globe Steel Tubes Co., Milwaukee, Wis.
Ladish Co., Cudahy, Wis.
Michigan Pipe Co., Bay City, Mich.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Potts Co., Horace T., Philadelphia, Pa.
Pypon Co., Pittsburgh, Pa.
Robinson Corp., Roselle Park, N. J.
Star Stainless Screw Co., Paterson, N. J.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tri-Clover Machine Co., Kenosha, Wis.
Tube Turns, Inc., Louisville, Ky.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
U. S. Plug & Fitting Co., Wellington, O. (pipe plugs)
Walworth Co., New York, N. Y.

Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.
Welding Fittings Corp., New Castle, Pa.

FITTINGS, PIPE, STAINLESS STEEL, WELDING

Camco Products, Inc., North Haven, Conn.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Electric Steel Foundry Co., Portland, Ore.
Key Co., East St. Louis, Ill.
Ladish Co., Cudahy, Wis.
Midwest Piping Co., Inc., St. Louis, Mo.
Pypon Co., Pittsburgh, Pa.
Robinson Corp., Roselle Park, N. J.
Star Stainless Screw Co., Paterson, N. J.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tri-Clover Machine Co., Kenosha, Wis.
Tube Turns, Inc., Louisville, Ky.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.
Welding Fittings Corp., New Castle, Pa.

FITTINGS, PIPE, STEEL, FLANGED

Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Bonney Forge & Tool Works, Allentown, Pa.
Crane Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Grinnell Co., Inc., Providence, R. I.
Kerotest Mfg. Co., Pittsburgh, Pa.
Michigan Pipe Co., Bay City, Mich.
National Valve & Mfg. Co., Pittsburgh, Pa.
Naylor Pipe Co., Chicago, Ill.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Semet-Solvay Engrg Div., Allied Chemical & Dye Corp., New York, N. Y.
Tri-Clover Machine Co., Kenosha, Wis.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Vilter Mfg. Co., The, Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.

FITTINGS, PIPE, STEEL, FORGED, THREADED

American Meter Co., Inc., Philadelphia, Pa.
Bonney Forge & Tool Works, Allentown, Pa.
Capitol Mfg. & Supply Co., Columbus, O.
Crane Co., Chicago, Ill.
Grinnell Co., Inc., Providence, R. I.
Henry Valve Co., Melrose Park, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Ladish Co., Cudahy, Wis.
Larkin Packer Co., Inc., St. Louis, Mo.
Tri-Clover Machine Co., Kenosha, Wis.
Vilter Mfg. Co., The, Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.
Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.

FITTINGS, PIPE, STEEL, SOCKET WELD

Bonney Forge & Tool Works, Allentown, Pa.
Capitol Mfg. & Supply Co., Columbus, O.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Grinnell Co., Inc., Providence, R. I.
Ladish Co., Cudahy, Wis.
Tri-Clover Machine Co., Kenosha, Wis.
Vilter Mfg. Co., The, Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.
Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.

FITTINGS, PIPE, STEEL, THREADED

Bonney Forge & Tool Works, Allentown, Pa.
Capitol Mfg. & Supply Co., Columbus, O.
Crane Co., Chicago, Ill.
Flodar Corp., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Gustin Bacon Mfg. Co., Kansas City, Mo.
Harrisburg Steel Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
Henry Valve Co., Melrose Park, Ill.
Ladish Co., Cudahy, Wis.
Parker Appliance Co., The, Cleveland, O.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa
Tubing Seal-Cap, Inc., San Gabriel, Calif. (plugs and caps)
U. S. Plug & Fitting Co., Wellington, O. (pipe plugs)
Vilter Mfg. Co., The, Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.
Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.

FITTINGS, PIPE, STEEL, WELDING

Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Bonney Forge & Tool Works, Allentown, Pa.
Crane Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Electric Steel Foundry Co., Portland, Ore.
Globe Steel Tubes Co., Milwaukee, Wis.
Grinnell Co., Inc., Providence, R. I.
Gustin Bacon Mfg. Co., Kansas City, Mo.
Ladish Co., Cudahy, Wis.
Larkin Packer Co., Inc., St. Louis, Mo.
Lumsden & Van Stone Co., Div. of Midwest Piping & Supply Co., South Boston, Mass.
Midwest Piping Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Naylor Pipe Co., Chicago, Ill.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tri-Clover Machine Co., Kenosha, Wis. (stainless steel)
Tube Turns, Inc., Louisville, Ky.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Vilter Mfg. Co., The, Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.

FITTINGS, PIPE, STEEL, WELDING, SEAMLESS

Crane Co., Chicago, Ill.
Globe Steel Tubes Co., Milwaukee, Wis.
Ladish Co., Cudahy, Wis.
Northern Indiana Brass Co., Elkhart, Ind.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tubes Turns, Inc., Louisville, Ky.

FITTINGS, PIPE, WROUGHT IRON, WELDING

Bonney Forge & Tool Works, Allentown, Pa.
Gustin Bacon Mfg. Co., Kansas City, Mo.
Ladish Co., Cudahy, Wis.
Midwest Piping Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tube Turns, Inc., Louisville, Ky.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Walworth Co., New York, N. Y.

FITTINGS, REFRIGERATION

Aero-Coupling Corp., Burbank, Calif.
Aeroquip Corp., Jackson, Mich.
Bakeraire Corp., South Windham, Me.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Forging and Mfg. Co., Chicago, Ill.
Commonwealth Brass Corp., Detroit, Mich.
Crane Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Ladish Co., Cudahy, Wis.
Madden Brass Products Co., Chicago, Ill.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Remco, Inc., Zelienople, Pa.
Scovill Mfg. Co., Waterville Div., Waterville, Conn.
Superior Valve & Fittings Co., Pittsburgh, Pa.
U. S. Plug & Fitting Co., Wellington, O. (pipe plugs)
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Wabash Mfg. Co., Chicago, Ill.
Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.
Weatherhead Co., Cleveland, O.
Wittenmeier Machinery Co., Chicago, Ill.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Inc., Chicago, Ill.
York Corp., York, Pa.

FITTINGS, STEEL TUBE, FLARED

Aircraft Fitting Co., Cleveland, O.
Couplings Co., Chicago, Ill.
Flodar Corp., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Imperial Brass Mfg. Co., Chicago, Ill.
Parker Appliance Co., The, Cleveland, O.
Weatherhead Co., The, Cleveland, O.

FITTINGS, STEEL TUBE, FLARELESS

Flodar Corp., Cleveland, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Parker Appliance Co., The, Cleveland, O.
Weatherhead Co., The, Cleveland, Ohio

FLAME CONTROLS

See Controls, Flame Failure

FLAME CUTTERS

See Cutters, Flame

FLANGE BOLTS

See Bolts and Studs, Flange

FLANGE SEPARATORS

See Separators, Flange

FLANGES, ORIFICE

American Meter Co., Inc., Philadelphia, Pa.
Barton Instrument Corp., Los Angeles, Calif.
Bristol Co., The, Waterbury, Conn.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Conoflow Corp., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Grinnell Co., Inc., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis.
Ladish Co., Cudahy, Wis.
Madden Corp., The, Chicago, Ill.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Taylor Forge & Pipe Wks., Chicago, Ill.
Trimount Instrument Co., Chicago, Ill.
Tube Turns, Inc., Louisville, Ky.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Walworth Co., New York, N. Y.

FLANGES, PIPE, ALLOY STEEL, LAP JOINT

Alloy Steel Products Co., Linden, N. J.
Camco Products, Inc., North Haven, Conn.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Globe Steel Tubes Co., Milwaukee, Wis.
Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
Ladish Co., Cudahy, Wis.
Marquette Coppersmithing Co., Philadelphia, Pa.
Midwest Piping Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Taylor Forge & Pipe Works, Chicago, Ill.
Tube Turns, Inc., Louisville, Ky.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Walworth Co., New York, N. Y.

FLANGES, PIPE, ALLOY STEEL, SCREWED

Camco Products Inc., North Haven, Conn.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Globe Steel Tubes Co., Milwaukee, Wis.
Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
Ladish Co., Cudahy, Wis.
Midwest Piping Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Star Stainless Screw Co., Paterson, N. J.
Taylor Forge & Pipe Works, Chicago, Ill.
Tube Turns, Inc., Louisville, Ky.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Walworth Co., New York, N. Y.

FLANGES, PIPE, ALLOY STEEL, WELDING

Camco Products Inc., North Haven, Conn.
Cooper Alloy Foundry Co., Hillside, N. J.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Globe Steel Tubes Co., Milwaukee, Wis.
Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
Key Co., East St. Louis, Ill.
Ladish Co., Cudahy, Wis.
Marquette Coppersmithing Co., Philadelphia, Pa.
Midwest Piping Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Star Stainless Screw Co., Paterson, N. J.
Taylor Forge & Pipe Works, Chicago, Ill.
Tube Turns, Inc., Louisville, Ky.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Walworth Co., New York, N. Y.
Welding Fitttings Corp., New Castle, Pa.

FLANGES, PIPE, ALUMINUM, WELDING

Ladish Co., Cudahy, Wis.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tube Turns, Inc., Louisville, Ky.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.

FLANGES, PIPE, BRASS, SCREWED

Acheson Mfg. Co., Rankin, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Conoflow Corp., Philadelphia, Pa.
Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Providence, R. I.
Grinnell Co., Inc., Providence, R. I.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Ladish Co., Cudahy, Wis.
National Valve & Mfg. Co., Pittsburgh, Pa.
Northern Indiana Brass Co., Elkhart, Ind.
Phoenix Brass Fittings Corp., Irvington, N. J.
Quaker City Iron Wks., Philadelphia, Pa.
Ritter Pattern & Casting Co., New York, N. Y.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Union Metal Works, Chelsea, Mass.
Walworth Co., New York, N. Y.

FLANGES, PIPE, CAST IRON, SCREWED

Clow & Sons, James B., Chicago, Ill.
Crane Co., Chicago, Ill.
Detroit Brass & Malleable Works, Detroit, Mich.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
G & H Mfg. Co., Philadelphia, Pa.
Grinnell Co., Inc., Providence, R. I.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kuhns Bros. Co., Dayton, O.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Ravena Iron Co., Ravena, N. Y.
Ritter Pattern & Casting Co., New York, N. Y.
Stockham Valves & Fittings, Birmingham, Ala.
Straight Line Foundry & Machine Corp., Direct Separator Div., Syracuse, N. Y.
Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Warren Foundry & Pipe Corp., New York, N. Y.

FLANGES, PIPE, MALLEABLE IRON, SCREWED

Bakeraire Corp., South Windham, Me.
Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Grabler Mfg. Co., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Jefferson Union Co., New York, N. Y.
National Valve & Mfg. Co., Pittsburgh, Pa.
Union Malleable Mfg. Co., Ashland, O.
Walworth Co., New York, N. Y.

FLANGES, PIPE, NICKEL AND NICKEL ALLOY

Camco Products, Inc., North Haven, Conn.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Hasco Valve & Machine Co., Milwaukee, Wis.
International Nickel Co., Inc., The, New York, N. Y.
Ladish Co., Cudahy, Wis.
Marquette Coppersmithing Co., Philadelphia, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tri-Clover Machine Co., Kenosha, Wis.
Tube Turns, Inc., Louisville, Ky.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Walworth Co., New York, N. Y.
Welding Fittings Corp., New Castle, Pa.

FLANGES, PIPE, STEEL, FORGED

Crane Co., Chicago, Ill.
Globe Steel Tubes Co., Milwaukee, Wis.
Grinnell Co., Inc., Providence, R. I.
Ladish Co., Cudahy, Wis.
Midwest Piping Co., Inc., St. Louis, Mo.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tube Turns, Inc., Louisville, Ky.

FLANGES, PIPE, STEEL, LAP JOINT

Chicago Metal Mfg. Co., Chicago, Ill.
Crane Co., Chicago, Ill.
Globe Steel Tubes Co., Milwaukee, Wis.
Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Corp., Harrisburg, Pa.
Ladish Co., Cudahy, Wis.
Lumsden & Van Stone Co., Div. of Midwest Piping & Supply Co., South Boston, Mass.
Marquette Coppersmithing Co., Philadelphia, Pa.
Midwest Piping Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.

Phoenix Mfg. Co., Joliet, Ill.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Taylor Forge & Pipe Works, Chicago, Ill.
Tube Turns, Inc., Louisville, Ky.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.

FLANGES, PIPE, STEEL, SCREWED

Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Frick Co., Waynesboro, Pa.
G & H Mfg. Co., Philadelphia, Pa.
Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Corp., Harrisburg, Pa.
Henry Valve Co., Melrose Park, Ill.
Hubbell Corp., Mundelein, Ill.
Ladish Co., Cudahy, Wis.
Lumsden & Van Stone Co., Div. of Midwest Piping & Supply Co., South Boston, Mass.
Midwest Piping Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Joliet, Ill.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Taylor Forge & Pipe Works, Chicago, Ill.
Tube Turns, Inc., Louisville, Ky.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
U. S. Plug & Fitting Co., Wellington, O.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.

FLANGES, PIPE, STEEL, WELDING

Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Atlantic Steel Co., Atlanta, Ga.
Bonney Forge & Tool Works, Allentown, Pa.
Crane Co., Chicago, Ill.
Globe Steel Tubes Co., Milwaukee, Wis.
Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Corp., Harrisburg, Pa.
Henry Valve Co., Melrose Park, Ill.
Hubbell Corp., Mundelein, Ill.
Key Co., East St. Louis, Ill.
Ladish Co., Cudahy, Wis.
Lumsden & Van Stone Co., Div. of Midwest Piping & Supply Co., South Boston, Mass.
Midwest Piping Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Naylor Pipe Co., Chicago, Ill.
Pennsylvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Joliet, Ill.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Roessing Mfg. Co., Pittsburgh, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Taylor Forge & Pipe Works, Chicago, Ill.
Tube Turns, Inc., Louisville, Ky.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.

FLARED FITTINGS, COPPER TUBE

See Fittings, Copper, Tube, Flared

FLARED FITTINGS, STEEL TUBE

See Fittings, Steel Tube, Flared

FLARING TOOLS FOR TUBING

See Tools, Flaring

FLEXIBLE COUPLINGS

See Couplings, Flexible

FLEXIBLE DUCT CONNECTIONS

See Connections, Duct, Flexible

FLEXIBLE METAL HOSE

See Hose, Metal and Fittings

FLOAT SWITCHES

See Switches, Float

FLOAT VALVES

See Valves, Float

FLOATS, STEAM TRAP, ETC.

Armstrong Machine Wks., Three Rivers, Mich.
Bailey Co., Chas. M., San Francisco, Calif.
Chicago Float Works, Not Inc., Chicago, Ill.
Crane Co., Chicago, Ill.
Harris & Co., Arthur, Chicago, Ill.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Kieley & Mueller, Inc., Middletown, N. Y.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Naugatuck Mfg. Co., Union City, Conn.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Owens & Co., Inc., Henry, Cranston, R. I.
Reichert Float & Mfg. Co., Toledo, O.
Reliance Gauge Column Co., Cleveland, O.
Sterling Engineering Mfg. Corp., Hyde Park, Mass.
Trane Co., The, La Crosse, Wis.
Watson & McDaniel Co., Philadelphia, Pa.
Williams Gauge Co., The, Pittsburgh, Pa.

FLOOR AND CEILING PLATES

See Plates, Floor and Ceiling

FLOW CONTROL VALVES

See Valves, Flow Control

FLOW MEASURING NOZZLES AND TUBES

See Nozzles, Flow Measuring

FLOW METERS

See Meters, Flow

FLOW SWITCHES

See Switches, Flow

FORGED STEEL VALVES

See Valves, Forged Steel

FRAMES, AIR INLET, PREFABRICATED, FOR AIR CONDITIONING UNITS

Livesay Window Co., Miami, Fla.

FRESHENERS, AIR

See Adsorbers, Odor; Compounds, Air Freshening

FUEL ECONOMIZERS

See Economizers, Fuel

FUEL OIL UNITS

See Units, Fuel Oil

FURNACES, DUCT

See Heaters, Duct

FURNACES, WARM AIR, FOR INDUSTRIAL AND LARGE BUILDING CENTRAL HEATING

(Exclusively for duct distribution of air—300,000 Btu per hr and over) For direct fired heaters, which may be located in the space heated or may be used in central plant installations with duct distribution of the air, see the listings under Heaters, Air, Direct Fired.

Air Conditioning Engineering Co., Cambridge, Mass.
Aladdin Heating Corp., San Leandro, Calif.
American Foundry & Furnace Co., Bloomington, Ill.
Arcweld Mfg. Co., Inc., Seattle, Wash.
Auburn Foundry, Inc., Auburn, Ind.
Bard Mfg. Co., Bryan, O.
Beck Engineering Combustion Kompany, St. Louis, Mo.
Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O
Campbell Co., E. K., Kansas City, Mo.
Campbell Heating Co., Des Moines, Ia.
Century Engineering Corp., Cedar Rapids, Ia.
Hayes Furnace Mfg. & Supply Co., Los Angeles, Calif.
International Sales Co., San Francisco, Calif.
Jackson & Church Co., Saginaw, Mich.
Lee Corporation, Wilmington, Del.
Lennox Furnace Co., Columbus, O.
MaGirl Foundry & Furnace Co., Bloomington, Ill.
McPherson Furnace & Supply Co., Portland, Ore.
Meyer Furnace Co., The, Peoria, Ill.
Mueller Furnace Co., L. J., Milwaukee, Wis.
National Heater Co., St. Paul, Minn.
Olson & Co., Arthur A., Canfield, O.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Quiet Automatic Oil Burner Corp., Newark, N. J.
Ray Oil Burner Co., San Francisco, Calif.
Rosebraugh Co., W. W., Salem, Ore.
Surface Combustion Corp., Toledo, O.
Syncromatic Corp., Watertown, Wis.
U. S. Machine Corp., Div. of Stewart-Warner Corp., Lebanon, Ind.
United States Radiator Corp., Detroit, Mich.

FUSIBLE LINKS

See Links, Fusible

GAGE GLASSES

See Glasses, Gage

GAGE TESTERS

See Testers, Gage, Dead Weight

GAGES, AIR FILTER

Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
Hays Corp., Michigan City, Ind.
Herbusch Corp., The, St. Louis, Mo. (Warning device)
Hill, E. Vernon, Chicago, Ill.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Meriam Instrument Co., The, Cleveland, O.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.

GAGES, INDICATING, DRAFT

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Canton Stoker Corp., Canton, O.
Cleveland Fuel Equipment Co., Cleveland, O.
Cole-Sewell Engineering Co., St. Paul, Minn.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Hays Corp., Michigan City, Ind.
Hill & Co., E. Vernon, Lake Geneva, Wis.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Perfex Corp., Milwaukee, Wis.
Precision Scientific Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.

GAGES, INDICATING, PRESSURE

Acragage Corp., Milford, Conn.
Air Conversion Research Corp., Chicago, Ill.
Ashton Valve Co., Wrentham, Mass.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Canton Stoker Corp., Canton, O.
Cleveland Fuel Equipment Co., Cleveland, O.
Crosby Steam Gage & Valve Co., Wrentham, Mass.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dickson Co., The, Chicago, Ill.
Dole Valve Co., The, Chicago, Ill.
Dunham Co., C. A., Chicago, Ill.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Electro Products Laboratories, Inc., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Garden City Instruments, Inc., Chicago, Ill.
General Blower Co., Inc., Philadelphia, Pa.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
Hays Corp., Michigan City, Ind.
Helicoid Gage Div., American Chain & Cable Co., Inc., Bridgeport, Conn.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Keller Tool Co., Grand Haven, Mich.
Lonergan Co., J. E., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marsh Heating Equipment Co., Skokie, Ill.
Marsh Instrument Co., Skokie, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
Meriam Instrument Co., The, Cleveland, O.
Mettler Co., Inc., The, Los Angeles, Calif.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Modern Engineering Co., St. Louis, Mo.
New York Air Valve Corp., Brooklyn, N. Y.
Norwalk Valve Co., South Norwalk, Conn.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Perfex Corp., Milwaukee, Wis.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Rochester Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Stewart-Warner Corp., South Wind Div., Indianapolis, Ind.
Taylor Instrument Companies, Rochester, N. Y.
Thrush & Co., H. A., Peru, Ind.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Div. of American Machine and Metals, Inc., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y.

GAGES, INDICATING, VACUUM

Acragage Corp., Milford, Conn.
Airserco Mfg. Co., Inc., Pittsburgh, Pa.
Ashton Valve Co., Wrentham, Mass.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Crosby Steam Gage Valve Co., Wrentham, Mass.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dickson Co., The, Chicago, Ill.
Dole Valve Co., The, Chicago, Ill.
Dunham Co., C. A., Chicago, Ill.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
Hastings Instrument Co., Inc., Hampton, Va.
Helicoid Gage Div., American Chain & Cable Co., Inc., Bridgeport, Conn.
Hill & Co., E. Vernon, Lake Geneva, Wis.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Lonergan Co., J. E., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marsh Heating Equipment Co., Skokie, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Norwalk Valve Co., South Norwalk, Conn.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Rochester Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Stewart-Warner Corp., South Wind Div., Indianapolis, Ind.
Stokes Machine Co., F. J., Philadelphia, Pa.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Div. of American Machine and Metals, Inc., Sellersville, Pa.
Wallace & Tiernan, Inc., Newark, N. J.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.

GAGES, LIQUID LEVEL

Alloy Steel Products Co., Linden, N. J. (Stainless steel)
American Injector Co., Detroit, Mich.
Ashton Valve Co., Wrentham, Mass.
Automatic Control Co., St. Paul, Minn.
Bailey Meter Co., Cleveland, O.
Barton Instrument Corp., Los Angeles, Calif.
Bristol Co., The, Waterbury, Conn.
Caldwell Co., W. E., Louisville, Ky.
Crane Co., Chicago, Ill.
Crosby Steam Gage & Valve Co., Wrentham, Mass.
Defender Instrument and Regulator Co., St. Louis, Mo.
Detroit Brass & Malleable Works, Detroit, Mich.
Diamond Power Specialty Corp., Lancaster, O.
Fielden Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Frick Co., Waynesboro, Pa.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Hays Corp., Michigan City, Ind.
Henry Valve Co., Melrose Park, Ill.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Keckley Co., O. C., Chicago, Ill.
King Engineering Corp., Ann Arbor, Mich.
Krueger Sentry Gauge Co., Green Bay, Wis.
Liquidepth Indicators, Inc., Long Island City, N. Y.
Liquidometer Corp., Long Island City, N. Y.
Lonergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Marshalltown Mfg. Co., Marshalltown, Ia.
Mel-Gauge Co., East Haven, Conn.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Moore Products Co., Philadelphia, Pa.
Morse-Smith-Morse, Inc., Watertown, Mass.
Nason Co., Clarkston, Mich.
New York Air Valve Corp., Brooklyn, N. Y.
Penberthy Injector Co., Detroit, Mich.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Powell Co., Wm., Cincinnati, O.
Reliance Gauge Column Co., Cleveland, O.
Republic Flow Meters Co., Chicago, Ill.
Rochester Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Shank Co., Cyrus, Cicero, Ill.

Stewart-Warner Corp., South Wind Div., Indianapolis, Ind.
Strahman Valves, Inc., New York, N. Y.
Swift Lubricator Co., Elmira, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Thermo Instrument Co., Belmont, Calif.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Div. of American Machine and Metals, Inc., Sellersville, Pa.
Visa-Test Sales Co., Burlingame, Calif.
Wallace & Tiernan Co., Newark, N. J.
Williams Gauge Co., The, Pittsburgh, Pa. (Water)
Wright-Austin Co., Detroit, Mich.
Yarnall-Waring Co., Philadelphia, Pa.

GAGES, OIL TANK

Applied Mechanics Co., Boston, Mass.
Boston Auto Gage Co., Pittsfield, Mass.
Boston Machine Works Co., Lynn, Mass.
Crosby Steam Gage & Valve Co., Wrentham, Mass.
Foxboro Co., Foxboro, Mass.
King Engineering Corp., Ann Arbor, Mich.
Krueger Sentry Gauge Co., Green Bay, Wis.
Liquidepth Indicators, Inc., Long Island City, N. Y.
Liquidometer Corp., Long Island City, N. Y.
Mel-Gauge Co., New Haven, Conn.
Penberthy Injector Co., Detroit, Mich.
Rochester Mfg. Co., Inc., Rochester, N. Y.
Scully Signal Co., Cambridge, Mass.
Strahman Valves, Inc., New York, N. Y.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
Viking Pump Co., Cedar Falls, Ia.

GAGES, PIPE

Three Point Industries, Chicago, Ill.

GALVANIZED SHEETS

See Sheets, Steel, Galvanized

GALVANNEALED SHEETS

See Sheets, Steel, Galvannealed

GARAGE VENTILATION FITTINGS

See Fittings, Exhaust, Garage, for Attaching Car Exhaust Pipe

GAS BURNERS

See Burners, Gas

GAS ENGINES

See Engines, Gas

GAS FIRED RADIATORS

See Radiators, Gas Fired

GAS PRESSURE REGULATORS

See Regulators, Pressure, Gas

GAS VENT AND FLUE PIPE

See Pipe and Fittings, Gas Vent and Flue

GAS VOLUME METERS

See Meters, Volume, Air and Gas

GASKETS

Acadia Synthetic Products Div., Western Felt Works, Chicago, Ill. (Felt, rubber)
Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Akron Metallic Gasket Co., Akron, O.
Alpha Metals, Inc., Jersey City, N. J.
American Felt Co., Glenville, Conn.
Anchor Packing Co., Philadelphia, Pa. (Asbestos)
Armstrong Cork Co., Lancaster, Pa., (Cork & cork composition)
Baldwin Belting, Inc., New York, N. Y.
Belmont Packing & Rubber Co., Philadelphia, Pa.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y. (Lead)
Brady Co., W. H., Milwaukee, Wis.
Chase Brass & Copper Co., Waterbury, Conn. (Brass and copper)
Chesterton Co., A. W., Everett, Mass.
Chicago Gasket Co., Chicago, Ill.
Chicago-Wilcox Mfg. Co., Chicago, Ill.
Clow & Sons, James B., Chicago, Ill.
Continental-Diamond Fibre Co., Newark, Del.
Continental Rubber Wks., Erie, Pa.
Crane Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y. (Asbestos)
Durabla Mfg. Co., New York, N. Y. (Asbestos fibre)
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Excelsior Leather Washer Mfg. Co., Rockford, Ill.
Federated Metal Div., American Smelting & Refining Co., New York, N. Y.
Felt Products Mfg. Co., Chicago, Ill. (Heat and oil resisting)
Felters Company, The, Boston, Mass.
Flexitallic Gasket Co., Camden, N. J. (Metal, asbestos)
Flexlock Corp., Kent, O.
Flexrock Co., Philadelphia, Pa.
Garlock Packing Co., Palmyra, N. Y.
Gatke Corp., Chicago, Ill.
General Electric Co., Chemical Div., Pittsfield, Mass.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Grant Wilson Inc., Chicago, Ill. (asbestos)
Graton & Knight Co., Worcester, Mass. (Leather)
Greene, Tweed & Co., North Wales, Pa.
Houghton & Co., E. F., Philadelphia, Pa. (Leather)
Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Linear Incorporated, Philadelphia, Pa.
Metallo Gasket Co., New Brunswick, N. J. (Metal, metal asbestos)
Mortell Co., J. W., Kankakee, Ill.
National Engineering Products, Inc., Washington, D. C. (Plastic)
National Lead Co., New York, N. Y. (lead)
New York Belting & Packing Co., Passaic, N. J.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Products Research Co., Los Angeles, Calif.
Quaker Rubber Corp., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber and asbestos)
Rubatex Div., Great American Industries, Inc., Bedford, Va.
Sall Mountain Co., Hamilton, O.
Saran Lined Pipe Co., Ferndale, Mich.
Schieren Co., Chas. A., New York, N. Y.
Sponge Rubber Products Co., The, Shelton, Conn.
Spring Packing Corp., Chicago, Ill.
Steel Improvement & Forge Co., Cleveland, O.
Stokes Molded Products, Inc., Trenton, N. J. (Hard rubber)
Strahman Valves, Inc., New York, N. Y.
Technical Ply-Woods, Chicago, Ill.
Thermoid Co., Trenton, N. J.
Union Asbestos & Rubber Co., Chicago, Ill.
United States Gasket Co., Camden, N. J.
United States Rubber Co., New York, N. Y. (Rubber, asbestos)
United States Stoneware Co., New York, N. Y.
Vickers, Inc., Div. of Sperry Corp., El Segundo, Calif.
Western Felt Wks., Chicago, Ill. (Felt)
Wolfe Co., Inc., The, Franklin C., 3644 Eastham Drive, Culver City, Calif.
Zimmerman Packing Co., Cincinnati, O. (also gasket cutters)

GASOLINE FIRED HEATERS

See Heaters, Gasoline Fired

GAS VENT AND FLUE PIPE AND FITTINGS

See Pipe and Fittings, Gas Vent and Flue

GATES, BLAST

Allington & Curtis Mfg. Co., Saginaw, Mich.
Berger Bros., Co., Philadelphia, Pa.
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Clarage Fan Co., Kalamazoo, Mich.
Day Co., The, Minneapolis, Minn.
Eclipse Fuel Engineering Co., Rockford, Ill.
Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Indiana Fan Co., Indianapolis, Ind.
Kirk & Blum Mfg. Co., Cincinnati, O.
Maysteel Products, Inc., Milwaukee, Wis.
Newcomb-Detroit Co., Detroit, Mich.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
Rockwell Co., W. S., Fairfield, Conn.
Spencer Turbine Co., Hartford, Conn.
Western Blower Co., Seattle, Wash.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.

GENERATORS, STEAM, ELECTRIC

Bigelow Co., The, New Haven, Conn.
Custom Engrg. Co., Los Angeles, Calif.
Hill Diesel Engine Corp., Lansing, Mich.
Livingstone Engineering Co., Worcester, Mass.

GLASS, HEAT ABSORBING

See Windows, Heat Insulating

GLASS PIPE

See Pipe, Glass

GLASSES, GAGE

Associated Valve & Engineering Co., Chicago, Ill.
Bache, Semon & Co., New York, N. Y.
Chicago Specialty Mfg. Co., Chicago, Ill.
Chesterton Co., A. W., Everett, Mass.
Corning Glass Works, Corning, N. Y.
Daigger & Co., A., Chicago, Ill.
Defender Instrument & Regulator Co., St. Louis, Mo.
Detroit Brass & Malleable Works, Detroit, Mich.
Diamond Power Specialty Corp., Lancaster, O.
Ernst Water Column & Gauge Co., Livingston, N. J.
Henry Valve Co., Melrose Park, Ill.
Libbey-Owens-Ford Glass Co., Toledo, O.
New York Air Valve Corp., Brooklyn, N. Y.
O P W Corp., Cincinnati, O.
Penberthy Injector Co., Detroit, Mich.

Reliance Gauge Column Co., Cleveland, O.
Scientific Instrument Co., Detroit, Mich.
Strahman Valves, Inc., New York, N. Y.
Superior Controls Co., Inc., Los Angeles, Calif.
Swift Lubricator Co., The, Elmira, N. Y.
Vilter Mfg. Co., The, Milwaukee, Wis.

GLASSES, SIGHT, FOR PIPE LINES

Allin Mfg. Co., Chicago, Ill.
American District Steam Co., Inc., North Tonawanda, N. Y.
Bowser, Inc., Fort Wayne, Ind.
Chesterton Co., A. W., Everett, Mass.
Cochrane Corp., Philadelphia, Pa.
Corning Glass Works, Corning, N. Y.
Fischer & Porter Co., Hatboro, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Libbey-Owens-Ford Glass Co., Toledo, O.
Mueller Brass Co., Port Huron, Mich.
O P W Corp., Cincinnati, O.
Penberthy Injector Co., Detroit, Mich.
Powell Co., Wm., The, Cincinnati, O.
Remco, Inc., Zelienople, Pa. (for refrigerant lines)
Sarco Co., Inc., New York, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Scientific Instrument Co., Detroit, Mich.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Swift Lubricator Co., The, Elmira, N. Y.
Trinity Equipment Corp., Roselle Park, New Jersey
Webster & Co., Warren, Camden, N. J.

GLOBE VALVES

See Valves, Globe

GLYCOL VAPORIZERS

See Units, Sterilizing, Air

GOVERNORS, PUMP

Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Boylston Steam Specialty Co., Chicago, Ill.
Burrows Mfg. Co., F. A., York, Pa.
Cash Co., A. W., Decatur, Ill.
Copes-Vulcan Div., Continental Foundry & Machine Co., Erie, Pa.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Hagan Corp., Pittsburgh, Pa.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., Middletown, N. Y.
Klipfel Valves, Inc., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., Cleveland, O.
Staples & Pfeiffer, San Francisco, Calif.
Swartwout Co., The, Cleveland, O.
Warren Engineering Co., Broadway, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Webster & Co., Warren, Camden, N. J.
Williams Gauge Co., The, Pittsburgh, Pa.

GRILLES

See also Diffusers; Panels, Perforated, for Air Diffusion; Registers

A & A. Register Co., Cleveland, O.
A-J Mfg. Co., Kansas City, Mo.
Air Control Products, Inc., Coopersville, Mich.
Air-Factors, Inc., Monrovia, Calif.
Alton Mfg. Co., Dallas, Tex.
American Warming & Ventilating Co., Toledo, O.
Auer Register Co., Cleveland, O.
Bahnson Co., Winston-Salem, N. C.
Barber-Colman Co., Rockford, Ill.
Beckley Perforating Co., Garwood, N. J.
Best Register Co., Milwaukee, Wis.
Central Wire & Iron Works, Des Moines, Ia.
Char-Gale Mfg. Co., Minneapolis, Minn.
Controlair Mfg. Co., Los Angeles, Calif.
Crown Iron Works, Minneapolis, Minn.
Decatur Iron & Steel Co., Decatur, Ala.
Diamond Mfg. Co., Wyoming, Pa.
Empire Ventilation Equipment Co., Long Island City, N. Y.
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chicago, Ill.
Hart & Cooley Mfg. Co., Holland, Mich.
Hendrick Mfg. Co., Carbondale, Pa.
Independent Register Co., Cleveland, O.
Jamieson Mfg. Co., Dallas, Tex.
Johnston & Chapman Co., Chicago, Ill.
Lima Register Co., The, Lima, O.
Lockjoint Wood Products Co., Wichita, Kans. (Wood)
Louvra Corp., The, Union, N. J.
Manhattan Perforated Metal Co., Inc., Long Island City, N. Y.
Martin Metal Products Corp., Ferndale, Mich.
Midco Register Corp., St. Paul, Minn.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mundt & Sons, Charles, Jersey City, N. J.
Palmer Mfg. Corp., Phoenix, Ariz.
Pennant Corp., Grand Rapids, Mich.
Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Reliable Perforating Co., Chicago, Ill.
Rock Island Register Co., Rock Island, Ill.
Smith Co., J. B., Philadelphia, Pa.
Standard Stamping & Perforating Co., Chicago, Ill.
Stewart Mfg. Co., Inc., Cedar Grove, N. J.
Titus Mfg. Corp., Waterloo, Iowa.
Tuttle & Bailey, Inc., New Britain, Conn.
United States Air Conditioning Corp., Minneapolis, Minn.
Utility Appliance Corp., Los Angeles, Calif.
Viking Mfg. Corp., Cleveland, O.
Waterloo Register Co., Inc., Waterloo, Ia.
Western Wire & Iron Works, Inc., Chicago, Ill. (metal)
Wickwire Spencer Steel, Div. of Colorado Fuel & Iron Corp., New York, N. Y.
Young Regulator Co., Cleveland, O.

GRINDERS AND GRINDING WHEELS, WELD

Baldor Electric Co., St. Louis, Mo.
Black & Decker Mfg. Co., The, Towson, Md.
Chicago Pneumatic Tool Co., New York, N. Y.
Cincinnati Electrical Tool Co., The, Cincinnati, O.
Diehl Mfg. Co., Finderne Plant, Somerville, N. J.
Generator Sales Co., Chicago, Ill.
Mall Tool Co., Chicago, Ill.
Milwaukee Electric Tool Corp., Milwaukee, Wis.
Norton Co., Worcester, Mass.
Raybestos-Manhattan, Inc., Passaic, N. J.
Rotor Tool Co., Cleveland, O.
Skil Corp., Chicago, Ill.
Speedway Mfg. Co., Chicago, Ill.
Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.
Thor Power Tool Co., Aurora, Ill.

GUNS AND POTS, SMOKE AND SMUDGE, FOR TESTING AIR MOVEMENT

Hill & Co., Vernon E., Lake Geneva, Wis.
Kilgore Mfg. Co., Westerville, O.
Mine Safety Appliances Co., Pittsburgh, Pa.
Newco Products, New York, N. Y. (smoke containers)
Unexcelled Chemical Corp., New York, N. Y.

HAND SHEARS

See Shears and Snips, Hand

HANGERS OR BRACKETS, RADIATOR

American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Arjac Products, Inc., Rochester, N. Y.
Carpenter & Paterson, Inc., East Boston, Mass.
Carty & Moore Engineering Co., Detroit, Mich.
Crawford Co., Chicago, Ill.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Gateway Engineering Co., Chicago, Ill.
Grinnell Co., Inc., Providence, R. I.
Hartmann Co., Chas., Brooklyn, N. Y.
Healy Ruff Co., St. Paul, Minn.
Jennison Co., Fitchburg, Mass. (Adjustable radiator foot rest)
Leibfried Mfg. Corp., C. H., Brooklyn, N. Y.
National Radiator Co., The, Johnstown, Pa.
Radiant-Ray Radiation, Inc., New Britain, Conn.
Rittling Corp., The, Buffalo, N. Y.
Unistrut Products Co., Chicago, Ill.
United States Radiator Corp., Detroit, Mich.

HANGERS AND SUPPORTS, DUCT

Acme Mfg. Co., Holmesburg, Philadelphia, Pa.
Atlantic Steel Co., Atlanta, Ga.
Excelsior Steel Furnace Co., The, Chicago, Ill.
Hexdall Co., A. M., Morris, Ill.
Moore Inc., Goodloe E., Danville, Ill.
Powder Power Tool Corp., Portland, Ore.
United Industries, Madison, Wis. (for use with precast concrete joists)
Unistrut Products Co., Chicago, Ill.
Velocity Power Tool Co., Pittsburgh, Pa. (cartridge stud driver)

HANGERS AND SUPPORTS, PIPE

American District Steam Co., Inc., North Tonawanda, N. Y.
Armart Mfg. Co., Pittsfield, Mass. (copper tube hanger)
Atlantic Steel Co., Atlanta, Ga. (perforated pipe hanger)
Bergen Pipesupport Corp., New York, N. Y. (variable spring constant support)
Blaw Knox Co., Power Piping and Sprinkler Div., Pittsburgh, Pa.
Carpenter & Paterson, Inc., East Boston, Mass.
Chase Brass & Copper Co., Waterbury, Conn. (copper strap)

Commercial Plastics Co., Chicago, Ill. (plastic strap)
Crane Co., Chicago, Ill.
Crawford Co., Chicago, Ill.
Farley Sleeve & Hanger Co., Cleveland, O.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Frick Co., Waynesboro, Pa.
G & H Mfg. Co., Philadelphia, Pa. (hook)
Gateway Engineering Co., Chicago, Ill.
General Fittings Co., Providence, R. I. (strap hangers)
Gerrard & Co., A. J., Melrose Park, Ill. (strap)
Grabler Mfg. Co., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Hupp Corp., Globe Stamping Div., Cleveland, O.
Korfund Co., Inc., Long Island City, N. Y.
Leibfried Mfg. Corp., C. H., Brooklyn, N. Y. (spring hangers and roller hangers)
Midwest Piping Co., Inc., St. Louis, Mo.
Minerallac Electric Co., Chicago, Ill.
Moore Inc., Goodloe E., Danville, Ill.
National Valve & Mfg. Co., Pittsburgh, Pa. (counterpoise)
Northern Indiana Brass Co., Elkhart, Ind. (copper tube)
Paine Co., Addison, Ill.
Piping Specialties, Inc., New York, N. Y. (anchor and guide for expansion joints)
Powder Power Tool Corp., Portland, Ore.
Ramset Div., Olin Industries, Inc., Cleveland O. (conduit clips)
Ravena Iron Co., Ravena, N. Y. (hook plates)
Ritter Pattern & Casting Co., New York, N. Y. (jack type adjustable tunnel stanchion)
Rockwood Sprinkler Co., Worcester, Mass.
Roessing Mfg. Co., Pittsburgh, Pa.
Russell Mfg. Co., John M., Div. of Risdon Mfg. Co., Naugatuck, Conn. (wire pipe hooks)
Schaub Engineering Co., Fred H., Chicago, Ill. (pipe stands)
Steinen Mfg. Co., Wm., Newark, N. J.
Titchener, E. H. & Co., Binghamton, N. Y. (wire staples for copper & brass tubing)
Truscon Steel Div., Republic Steel Corp., Youngstown, O. (pressed steel inserts)
Unistrut Products Co., Chicago, Ill.
United Industries, Madison, Wis. (for use with precast concrete joists)
Velocity Power Tool Co., Pittsburgh, Pa. (cartridge stud driver)
Walworth Co., New York, N. Y.
Western Wire Products Co., St. Louis, Mo. (wire pipe hooks and perforated hanger iron)

HARD RUBBER PIPE AND FITTINGS

See Pipe, Hard Rubber; Fittings, Pipe, Hard Rubber

HEADERS, PIPE, WELDED

Acme Industries, Inc., Jackson, Mich.
Albert Pipe Supply Co., Brooklyn, N. Y.
American Locomotive Co., Alco Products Div., Dunkirk, N. Y.
Atlantic Pipe Bending & Fabricating Corp., Wood-Ridge, N. J.
Bakeraire Corp., South Windham, Me.
Biggs Boiler Wks. Co., The, E. Akron, O.
Blaw Knox Co., Power Piping and Sprinkler Div., Pittsburgh, Pa.
Buffalo Tank Corp., Newark, N. J.
Chicago Nipple Mfg. Co., Cicero, Ill.
Clow & Sons, James B., Chicago, Ill.
Cobra Pipe & Coil Co., Inc., Elmwood, Conn.
Columbian Steel Tank Co., Kansas City, Mo.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Crane Co., Chicago, Ill.
Downingtown Iron Works, Downingtown, Pa.
Dravo Corp., Machinery Div., Pittsburgh, Pa.
Flori Pipe Co., The, St. Louis, Mo.
Fluor Corp., Ltd., The, Los Angeles, Calif.
Frick Co., Waynesboro, Pa.
Grinnell Co., Inc., Providence, R. I.
International Engineering Wks., Inc., Framingham, Mass.
Kellogg Co., M. W., The, New York, N. Y.
Lumsden & Van Stone Div. of Midwest Piping & Supply Co., South Boston, Mass.
Manning & Lewis Engineering Co., Newark, N. J.
Marquette Coppersmithing Co., Philadelphia, Pa.
Michigan Pipe Co., Bay City, Mich.
Midwest Piping Co., Inc., St. Louis, Mo.
Mitchell & Co., Inc., W. K., Philadelphia, Pa.
National Pipe Bending Co., New Haven, Conn.
National Valve & Mfg. Co., Pittsburgh, Pa.
Naylor Pipe Co., Chicago, Ill.
Ohio Pipe Bending & Mach. Co., Cleveland, O.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Pittsburgh Pipe Coil & Bending Co., Etna, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Reco Products Div., Recony Corp., New York, N. Y.
Red Jacket Co., Inc., Pittsburgh, Pa.
Rempe Co., Chicago, Ill.
Richmond Engineering Co., Inc., Richmond, Va.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Shaw Co., Benjamin F., Wilmington, Del.
Shaw Kendall Engineering Co., Toledo, O.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Vilter Mfg. Co., Milwaukee, Wis.
Western Piping & Engineering Co., San Francisco, Calif.
Whitlock Mfg. Co., Hartford, Conn.

HEADS, EXHAUST, FOR PIPE LINES

Anderson Co., V. D., The, Cleveland, O.
Brighton-Dickinson Div., Chicago, Ill.
Centrifix Corp., Cleveland, O.
Cochrane Corp., Philadelphia, Pa.
Flori Pipe Co., The, St. Louis, Mo.
Hoppes Mfg. Co., Inc., Springfield, O.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Kieley & Mueller, Inc., Middletown, N. Y.
Swartwout Co., The, Cleveland, O.
Wright-Austin Co., Detroit, Mich.

HEADS, SAFETY

Black, Sivalls & Bryson, Inc., Kansas City, Mo.

HEADS, SPRINKLER, FOR FIRE PROTECTION

Grinnell Co., Inc., Providence, R. I.
Hoogman Mfg. Co., Taunton, Mass.
Raisler Corp., Grimes Sprinkler Div., New York, N. Y.
Rockwood Sprinkler Co., Worcester, Mass.

HEAT EXCHANGERS

See Chillers, Water; Condensers, Refrigerating; Exchangers, Heat; Surface, Cooling; Surface, Heating

HEAT PUMPS

See Units, Air Conditioning, Reverse Refrigeration Cycle

HEAT RECOVERY UNITS

See Units, Heat Recovery

HEAT REGENERATORS

See Units, Heat Recovery

HEATERS, AIR, DIRECT FIRED, COAL

Campbell Co., E. K., Kansas City, Mo.
Campbell Heating Co., Des Moines, Ia.
Jackson & Church Co., Saginaw, Mich.
Johnson Heater Corp., Chelsea, Mass.
Lee Corporation, Wilmington, Del.
MaGirl Foundry & Furnace Co., Bloomington, Ill.
National Heater Co., St. Paul, Minn.
Olson & Co., Arthur A., Canfield, O.
Rosebraugh Co., W. W., Salem, Ore.

HEATERS, AIR, DIRECT FIRED, COMBINATION GAS AND OIL

Air Conditioning Engineering Co., Cambridge, Mass.
Airtherm Mfg. Co., St. Louis, Mo.
Dravo Corp., Machinery Div., Pittsburgh, Pa.
Drying Systems, Inc., Chicago, Ill.
MaGirl Foundry & Furnace Co., Bloomington, Ill.
Jackson & Church Co., Saginaw, Mich.
Lee Corp., Wilmington, Del.
Olson & Co., Arthur A., Canfield, O.
Prat-Daniel Corp., South Norwalk, Conn.
Ross Engineering Corp., J. O., New York, N. Y.

HEATERS, AIR, DIRECT FIRED, GAS, CENTRIFUGAL FAN TYPE

For Furnaces for Central Plant Installation EXCLUSIVELY for Duct Distribution of the Air, See the Listing Under Furnaces

Air Conditioning Engineering Co., Cambridge, Mass.
Airtherm Mfg. Co., St. Louis, Mo.
American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
Auburn Burner Co., Auburn, Ind.
Automatic Gas Equipment Co., Pittsburgh, Pa.
Campbell Co., E. K., Kansas City, Mo.
Campbell Heating Co., Des Moines, Ia.
Chicago Steel Furnace Co., Chicago, Ill.
Dravo Corp., Pittsburgh, Pa.
Drying Systems, Inc., Chicago, Ill.
General Gas Light Co., Kalamazoo, Mich.
Hastings Air Conditioning Co., Inc., Hastings, Neb.
Hayes Furnace Mfg. & Supply Co., Los Angeles, Calif.
MaGirl Foundry & Furnace Co., Bloomington, Ill.
International Sales Co., San Francisco, Calif.
Jackson & Church Co., Saginaw, Mich.
Johnson Heater Corp., Chelsea, Mass.
Kilbury Mfg. Co., Inc., Lawndale, Calif.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Nat Corp., Kansas City, Mo.
National Heater Co., St. Paul, Minn.
Newcomb-Detroit Co., Detroit, Mich.
Norge Heat Div., Borg-Warner Corp., Detroit, Mich.
Norman Products Co., Inc., Columbus, O.
Olson & Co., Arthur A., Canfield, O.
OverHead Heaters, Inc., Detroit, Mich.
Payne Furnace Div., Affiliated Gas Equipment Inc., Monrovia, Calif.
Prat-Daniel Corp., East Port Chester, Conn.
Reznor Mfg. Co., Mercer, Pa.

Rockwell Co., W. S., Fairfield, Conn.
Surface Combustion Corp., Toledo, O.
United States Air Conditioning Corp., Minneapolis, Minn.
Utility Appliance Corp., Los Angeles, Calif.
Zink Co., John, Tulsa, Okla.

HEATERS, AIR, DIRECT FIRED, OIL, FLOOR TYPE

Air Conditioning Engineering Co., Cambridge, Mass.
Airtherm Mfg. Co., St. Louis, Mo.
American Foundry & Furnace Co., Bloomington, Ill.
Anchor Div., Stratton & Terstegge Co., Inc., New Albany, Ind.
Campbell Co., E. K., Kansas City, Mo.
Campbell Heating Co., Des Moines, Ia.
Chicago Steel Furnace Co., Chicago, Ill.
Dravo Corp., Machinery Div., Pittsburgh, Pa.
Drying Systems, Inc., Chicago, Ill.
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Jackson & Church Co., Saginaw, Mich.
Johnson Heater Corp., Chelsea, Mass.
MaGirl Foundry & Furnace Co., Bloomington, Ill.
National Heater Co., St. Paul, Minn.
Olson & Co., Arthur A., Canfield, O.
Prat-Daniel Corp., East Port Chester, Conn.
Ross Engineering Corp., J. O., New York, N. Y.
Williams Div., Eureka Williams Corp., Bloomington, Ill.

HEATERS, AIR, DIRECT FIRED, OIL, PORTABLE, FOR INDUSTRIAL SPACE HEATING

Air Conditioning Engineering Co., Cambridge, Mass.
Auburn Burner Co., Auburn, Ind.
Bica Co., Girard, O. (50,000-85,000 Btu)
Cauhorn Distributing Co., Detroit, Mich. (190,000 Btu)
Chicago Steel Furnace Co., Chicago, Ill.
Delta Heating Corp., Trenton, N. J.
Fageol Heat Machine Co., Detroit, Mich.
National Heater Co., St. Paul, Minn.
Olson & Co., Arthur A., Canfield, O.
Prat-Daniel Corp., East Port Chester, Conn. (100,000 Btu up to 1,000,000 Btu)
Quiet Automatic Oil Burner Corp., Newark, N. J.

HEATERS, AIR, DIRECT FIRED, OIL, SUSPENDED TYPE

Air Conditioning Engineering Co., Cambridge, Mass.
Airtherm Mfg. Co., St. Louis, Mo.
Auburn Burner Co., Auburn, Ind.
American Furnace Co., St. Louis, Mo.
Beck Engineering Combustion Kompany, St. Louis, Mo.
Cox Mfg. Co., Ridgeville, Ind.
Campbell Co., E. K., Kansas City, Mo.
Chicago Steel Furnace Co., Chicago, Ill.
Delta Heating Corp., Trenton, N. J.
Dravo Corp., Machinery Div., Pittsburgh, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Fluid Heat Div., Anchor Post Products, Inc., Baltimore, Md.
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Harvey-Whipple, Inc., Springfield, Mass.
Jackson & Church Co., Saginaw, Mich.
Lee Corp., Wilmington, Del.
Mueller Furnace Co., L. J., Milwaukee, Wis.
National Heater Co., St. Paul, Minn.
Olson & Co., Arthur A., Canfield, O.
OverHead Heaters, Inc., Detroit, Mich.
Petro, Cleveland, O.
Prat-Daniel Corp., East Port Chester, Conn.
Quiet Automatic Oil Burner Corp., Newark, N. J.
Waterman-Waterbury Co., The, Minneapolis, Minn.
Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington, Ill.

HEATERS, CONVECTION

See Radiation, Convection Type

HEATERS, DUCT, ELECTRIC

Brown Fintube Co., The, Elyria, O.
Consolidated Metal Products Corp., Albany, N. Y.
Despatch Oven Co., Minneapolis, Minn.
Electromode Corp., Rochester, N. Y.
Falcon Equipment Co., New Brighton, Pa.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hynes Electric Div., Turbine Equipment Co., Westfield, N. J.
Industrial Engineering & Equipment Co., St. Louis, Mo.
Kilbury Mfg. Co., Inc., Lawndale, Calif.
Tenney Engineering, Inc., Newark, N. J.
Trent Inc., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
Wesix Electric Heater Co., San Francisco, Calif.
Wiegand Co., Edwin L., Pittsburgh, Pa.
Wing Mfg. Co., L. J., Linden, N. J.

HEATERS, DUCT, GAS

Allan Engineering Co., Dallas, Tex.
Automatic Gas Equipment Co., Pittsburgh, Pa.
Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O.
Carrier Corp., Syracuse, N. Y.
Dravo Corp., Machinery Div., Pittsburgh, Pa.
Dunham Co., C. A., Chicago, Ill.
General Gas Light Co., Kalamazoo, Mich.
Great National Air Conditioning Corp., Oklahoma City, Okla.
Hayes Furnace Mfg. & Supply Co., Los Angeles, Calif.
International Sales Co., San Francisco, Calif.
Kehm Corp., The, Chicago, Ill.
Meyer Furnace Co., The, Peoria, Ill.
Naco Mfg. Co., Huntington Park, Calif.
Norman Products Co., Inc., Columbus, O.
Palmer Mfg. Corp., Phoenix, Ariz.
Payne Furnace Div., Affiliated Gas Equipment, Inc., Monrovia, Calif.
Reznor Mfg. Co., Mercer, Pa.
Royal Jet, Inc., Alhambra, Calif.
St. Louis Blow Pipe & Heater Co., Div. of Young Sales Corp., St. Louis, Mo.
Surface Combustion Corp., Toledo, O.
United States Air Conditioning Corp., Minneapolis, Minn.
Utility Appliance Corp., Los Angeles, Calif.

HEATERS, FEEDWATER

See Deaerators

HEATERS, GASOLINE FIRED (FOR AIRCRAFT AND PORTABLE GROUND USE)

American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
Devenco, Inc., Swingfire Div., New York, N. Y.
Fluid Heat Div., Anchor Post Products Inc., Baltimore, Md.
Perfection Stove Co., Cleveland, O.
Stewart-Warner Corp., South Wind Div., Indianapolis, Ind.
Surface Combustion Corp., Toledo, O.

HEATERS, INDIRECT, SUBMERGED

American District Steam Co., Inc., North Tonawanda, N. Y.
Bell & Gossett Co., Morton Grove, Ill.
Brown Fintube Co., Elyria, O.
Davis Engineering Corp., Elizabeth, N. J.
General Fittings Co., Providence, R. I.
General Heater & Regulators Co., East Chicago, Ind.
Gerstein & Cooper Co., Inc., South Boston, Mass.
Graham Mfg. Co., Inc., New York, N. Y.
Lindy Heaters, Inc., New York, N. Y.
Manning & Lewis Engineering Co., Newark, N. J.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Penberthy Injector Co., Detroit, Mich.
Richmond Engineering Co., Inc., Richmond, Va.
Sims Co., Erie, Pa.
Superior Combustion Industries, Inc., Detroit, Mich.
Taco Heaters, Inc., Providence, R. I.
Western Blower Co., Seattle, Wash.
Whitlock Mfg. Co., Hartford, Conn.
Yula Water Heaters, Inc., New York, N. Y.

HEATERS, OIL

See Preheaters, Fuel Oil: Units, Fuel Oil, Heating, Pumping and Straining

HEATERS, RADIATION, FOR SUPPLYING HOT WATER RADIATION FROM STEAM BOILER

Bell & Gossett Co., Morton Grove, Ill.
Davis Engineering Corp., Elizabeth, N. J.
Lindy Heaters, Inc., New York, N. Y.
Thrush & Co., H. A., Peru, Ind.
Union Asbestos & Rubber Co., Chicago, Ill.

HEATERS, STEAM JET, FOR LIQUIDS

Duriron Co., Inc., The, Dayton, O.
Heil Process Equipment Corp., Cleveland, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
O'Brien Steam Specialty Co., Inc., Syracuse, N. Y.
Penberthy Injector Co., Detroit, Mich.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Sims Co., Erie, Pa.

HEATERS, STRIP AND IMMERSION, ELECTRIC

American Instrument Co., Inc., Silver Spring, Md.
Consolidated Metal Products Corp., Albany, N. Y.
Cutler-Hammer, Inc., Milwaukee, Wis.
Electro-Therm, Inc., Silver Spring, Md.
Falcon Equipment Co., New Brighton, Pa.
Fluid Systems, Inc., New Haven, Conn.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Heil Process Equipment Corp., Cleveland, O.
Hynes Electric Heating Div., Turbine Equipment Co., Westfield, N. J.
Industrial Engineering & Equipment Co., St. Louis, Mo.
Red Spot Electric Co., Tacoma, Wash.
Syntron Co., Homer City, Pa.
Titan Mfg. Co., Buffalo, N. Y.
Trent Inc., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
Wesix Electric Heater Co., San Francisco, Calif.
Westinghouse Electric Corp., Pittsburgh, Pa.
Wiegand Co., Edwin L., Pittsburgh, Pa.

HEATERS, SUSPENDED, RADIANT, ELECTRIC

General Electric Co., Apparatus Sales Div., Schenectady, N. Y.

ThermoRay Corp., New York, N. Y.
Trent, Inc., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
Wiegand Co., Edwin L., Pittsburgh, Pa.

HEATERS, SUSPENDED, RADIANT, GAS FIRED

Day & Night Div., Affiliated Gas Equipment, Inc., Monrovia, Calif
Nat Corp., Kansas City, Mo.
Olson & Co., Arthur A., Canfield, O.
Power Engineering Co., Chicago, Ill.

HEATERS, UNIT, ELECTRIC HEATING ELEMENT

Electromode Corp., Rochester, N. Y.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hynes Electric Heating Div., Turbine Equipment Co., Westfield, N. J.
Kilbury Mfg. Co., Inc., Lawndale, Calif.
Lintern Corp., Painesville, O.
Meco, Inc., Portland, Ore.
Red Spot Electric Co., Tacoma, Wash.
Royal Heaters, Inc., Alhambra, Calif.
Trent Inc., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
Wesix Electric Heater Co., San Francisco, Calif.
Westinghouse Electric Corp., Pittsburgh, Pa.
Wiegand Co., Edwin L., Pittsburgh, Pa.
Wing Mfg. Co., L. J., Linden, N. J.

HEATERS, UNIT, ELECTRIC HEATING ELEMENT, EXPLOSION PROOF

Electromode Corp., Rochester, N. Y.
Trent, Inc., Philadelphia, Pa.

HEATERS, UNIT, GAS, PROPELLER FAN TYPE

Airtherm Mfg. Co., St. Louis, Mo.
Allan Engineering Co., Dallas, Tex.
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Blower Corp., Detroit, Mich.
American Furnace Co., St. Louis, Mo.
Automatic Gas Equipment Co., Pittsburgh, Pa.
Barwick Mfg. Corp., Wichita, Kan.
Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O.
Carrier Corp., Syracuse, N. Y.
Clow & Sons, James B., Chicago, Ill.
Coroaire Heater Corp., The, Cleveland, O.
Dravo Corp., Machinery Div., Pittsburgh, Pa.
Dunham Co., C. A., Chicago, Ill.
Fedders-Quigan Corp., Buffalo, N. Y.
General Gas Light Co., Kalamazoo, Mich.
Grinnell Co., Inc., Providence, R. I.
Hastings Air Conditioning Co., Hastings, Neb.
Henry Furnace Co., The, Medina, O.
International Sales Co., San Francisco, Calif.
Ilg Electric Ventilating Co., Chicago, Ill.
Jackson & Church Co., Saginaw, Mich.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Mission Appliance Corp., Hawthorne, Calif.
Modine Mfg. Co., Racine, Wis.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Nat Corp., Kansas City, Mo.
National Radiator Co., The, Johnstown, Pa.
Nesbitt, Inc., John J., Philadelphia, Pa.
Norman Products Co., Inc., Columbus, O.
Palmer Mfg. Corp., Phoenix, Ariz.
Payne Furnace Div., Affiliated Gas Equipment Inc., Monrovia, Calif.
Reznor Mfg. Co., Mercer, Pa.
Roberts-Gordon Appliance Corp., Buffalo, N. Y.
Sonner Burner Co., Winfield, Kan.
Sterling Heat Specialties, Inc., Westfield, Mass.
Surface Combustion Corp., Toledo, O.
Trane Co., The, La Crosse, Wis.
United States Air Conditioning Corp., Minneapolis, Minn.
United States Radiator Corp., Detroit, Mich.
Utility Appliance Corp., Los Angeles, Calif.
Webster & Co., Warren, Camden, N. J.
Westinghouse Electric Corp., Sturtevant Div., Hyde Park, Boston, Mass.
Wing Mfg. Co., L. J., Linden, N. J.
Young Radiator Co., Racine, Wis.
Zink Co., John, Tulsa, Okla.

HEATERS, UNIT, OIL, PROPELLER FAN TYPE

Delta Heating Corp., Trenton, N. J.

HEATERS, UNIT, STEAM AND HOT WATER, CABINET TYPE

Air Conditioning Engineering Co., Cambridge, Mass.
Airtherm Mfg. Co., St. Louis, Mo.
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Blower Corp., Detroit, Mich.
American Thermal Industries, Inc., Detroit, Mich.
Brown Products Co., Forest Hills, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Dunham Co., C. A., Chicago, Ill.
Hastings Air Conditioning Co., Hastings, Neb.
McCord Corp., Detroit, Mich.
Modine Mfg. Co., Racine, Wis.
Nesbitt, Inc., John J., Philadelphia, Pa.
SelecTemp Div., Iron Fireman Mfg. Co., Cleveland, O.
Trane Co., The, La Crosse, Wis.
Union Asbestos & Rubber Co., Chicago, Ill.
United States Air Conditioning Corp., Minneapolis, Minn.
Webster & Co., Warren, Camden, N. J.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Young Radiator Corp., Racine, Wis.

HEATERS, UNIT, STEAM AND HOT WATER, CENTRIFUGAL FAN TYPE

Air Conditioning Engineering Co., Cambridge, Mass.
Airtherm Mfg. Co., St. Louis, Mo.
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Blower Corp., Detroit, Mich.
American Thermal Industries, Inc., Detroit, Mich.
Bayley Blower Co., Milwaukee, Wis.
Bishop & Babcock Mfg. Co., Cleveland, O.
Blazer, M. & Son, Passaic, N. J.
Brown Products Co., Forest Hills, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
Dunham Co., C. A., Chicago, Ill.
Hastings Air Conditioning Co., Hastings, Neb.
Kennard Corp., St. Louis, Mo.
Marlo Coil Co., St. Louis, Mo.
McCord Corp., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
Nesbitt, Inc., John J., Philadelphia, Pa.
New York Blower Co., Chicago, Ill.
St. Louis Blow Pipe & Heater Co., Div. of Young Sales Corp., St. Louis, Mo.
Trane Co., The, La Crosse, Wis.
United States Air Conditioning Corp., Minneapolis, Minn.
Webster & Co., Warren, Camden, N. J.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wilson Engineering Corp., Chicago, Ill.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
Young Radiator Co., Racine, Wis.

HEATERS, UNIT, STEAM AND HOT WATER, PROPELLER FAN TYPE, HORIZONTAL BLOW

Airtherm Mfg. Co., St. Louis, Mo.
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Blower Corp., Detroit, Mich.
Beacon-Morris Corp., Boston, Mass.
Bishop & Babcock Mfg. Co., Cleveland, O.
Buffalo Forge Co., Buffalo, N. Y.
Burnham Corp., Boiler Div., Irvington, N. Y.
Carrier Corp., Syracuse, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
Dunham Co., C. A., Chicago, Ill.
Fedders-Quigan Corp., Buffalo, N. Y.
Grinnell Co., Inc., Providence, R. I.
Hartzell Propeller Fan Co., Piqua, O.
Ilg Electric Ventilating Co., Chicago, Ill.
King Co., The, Owatonna, Minn.
Kisco Boiler & Engineering Co., St. Louis, Mo.
McCord Corp., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
Merchant & Evans Co., Philadelphia, Pa.
Modine Mfg. Co., Racine, Wis.
Muckle Mfg. Co., Owatonna, Minn.
Murray Mfg. Co., D. J., Wausau, Wis.
National Radiator Co., The, Johnstown, Pa.
Nesbitt, Inc., John J., Philadelphia, Pa.
New York Blower Co., Chicago, Ill.
Power Engineering Co., Chicago, Ill.
Rittling Corp., The, Buffalo, N. Y.
St. Louis Blow Pipe & Heater Co., Div. of Young Sales Corp., St. Louis, Mo.
Silco Products, Inc., Minneapolis, Minn.
Tenney Engineering, Inc., Newark, N. J.
Trane Co., The, La Crosse, Wis.
Union Asbestos & Rubber Co., Chicago, Ill.
United States Air Conditioning Corp., Minneapolis, Minn.
United States Radiator Corp., Detroit, Mich.
Webster & Co., Warren, Camden, N. J.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wilson Engineering Corp., Chicago, Ill.
Wing Mfg. Co., L. J., Linden, N. J.
Young Radiator Co., Racine, Wis.

HEATERS, UNIT, STEAM AND HOT WATER, PROPELLER FAN TYPE, VERTICAL BLOW

Airtherm Mfg. Co., St. Louis, Mo.
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Blower Corp., Detroit, Mich.

Beacon-Morris Corp., Boston, Mass.
Bishop & Babcock Mfg. Co., Cleveland, O.
Buffalo Forge Co., Buffalo, N. Y.
Burnham Corp., Boiler Div., Irvington, N. Y.
Carrier Corp., Syracuse, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
Dunham Co., C. A., Chicago, Ill.
Fedders-Quigan Corp., Buffalo, N. Y.
Grinnell Co., Inc., Providence, R. I.
McCord Corp., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
Modine Mfg. Co., Racine, Wis.
Murray Mfg. Co., D. J., Wausau, Wis.
National Radiator Co., The, Johnstown, Pa.
Nesbitt, Inc., John J., Philadelphia, Pa.
New York Blower Co., Chicago, Ill.
Power Engineering Co., Chicago, Ill.
Rittling Corp., The, Buffalo, N. Y.
Silco Products Inc., Minneapolis, Minn.
Trane Co., The, La Crosse, Wis.
Union Asbestos & Rubber Co., Chicago, Ill.
United States Air Conditioning Corp., Minneapolis, Minn.
United States Radiator Corp., Detroit, Mich.
Webster & Co., Warren, Camden, N. J.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wing Mfg. Co., L. J., Linden, N. J.
Young Radiator Co., Racine, Wis.

HEATERS, VENTILATION

See Surface, Finned, Heating; Ventilators, Roof, Fan; Ventilators, Unit; Surface, Finned, Heating; Ventilators, Roof, Fan

HEATERS, WALL CIRCULATING, GAS FIRED

Central States Mfg. Co., Inc., Arkansas City, Kan.
Coroaire Heater Corp., The, Cleveland, Ohio
General Gas Light Co., Kalamazoo, Mich.
Mission Appliance Corp., Hawthorne, Calif.
Payne Furnace Div., Affiliated Gas Equipment Inc., Monrovia, Calif.
Royal Jet, Inc., Alhambra, Calif.
Stewart-Warner Corp., South Wind Div., Indianapolis, Ind.
Westinghouse Electric Corp., Sturtevant Div., Hyde Park, Boston, Mass.

HEATERS, WATER, AIR-TANKLESS

Tankless Water Heater and Compression Tank Combined

Bell & Gossett Co., Morton Grove, Ill.
General Fittings Co., Providence, R. I.
Taco Heaters, Inc., Providence, R. I.

HEATERS, WATER, CAST IRON, COAL FIRED

Adams Co., The, Dubuque, Ia.
American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Burnham Corp., Boiler Div., Irvington, N. Y.
Peerless Heater Div., The Eastern Foundry Co., Boyertown, Pa.
Prox Co., Inc., Frank, Terre Haute, Ind.
Smith Co., Inc., H. B., The, Westfield, Mass.
United States Radiator Corp., Detroit, Mich.
Weil-McLain Co., Michigan City, Ind.

HEATERS, WATER, ELECTRIC

Allcraft Mfg. Co., Cambridge, Mass.
Auburn Burner Co., Auburn, Ind.
Bastian-Morley Co., Inc., LaPorte, Ind.
Clayton & Lambert Mfg. Co., Louisville, Ky.
Copper Boiler & Heater Wks., Manitowoc, Wis.
Crane Co., Chicago, Ill.
Custom Engineering Co., Los Angeles, Calif.
Cutler-Hammer, Inc., Milwaukee, Wis.
Frigidaire Div., General Motors Corp., Dayton, O.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hanson-Gates Mfg. Co., Inc., Reading, Mass.
Hynes Electric Heating Div., Turbine Equipment Co., Westfield, N. J.
Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Hotpoint Co., Chicago, Ill.
Hotstream Heater Co., Cleveland, O.
Industrial Engineering & Equipment Co., St. Louis, Mo.
Iron Fireman Mfg. Co., Cleveland, O.
Livingstone Engineering Co., Worcester, Mass.
McGraw Electric Co., Clark Div., Chicago, Ill.
Mission Appliance Corp., Hawthorne, Calif.
Red Spot Electric Co., Tacoma, Wash.
Rheem Mfg. Co., New York, N. Y.
Smith Corp., A. O., Milwaukee, Wis.
Trent Inc., Philadelphia, Pa.
Viking Mfg. Corp., Cleveland, O.
Vulcan Electric Co., Danvers, Mass.
Wesix Electric Heater Co., San Francisco, Calif.
Westinghouse Electric Corp., Pittsburgh, Pa.
Wiegand Co., Edwin L., Pittsburgh, Pa.
Wood Co., John, Conshohocken, Pa.
York-Shipley, Inc., York, Pa.

HEATERS, WATER, GAS FIRED

Alert Boiler & Mfg. Co., Detroit, Mich.
Aldrich Co., Wyoming, Ill.
Alstrom Corp., Bronx, N. Y.
American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Auburn Burner Co., Auburn, Ind.
Bastian-Morley Co., Inc., LaPorte, Ind.
Bica Co., Girard, O.
Brown Products Co., Forest Hills, N. Y.
Bryan Steam Corp., Peru, Ind.
Bryant Corp., C. L., Cleveland, O.
Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O.
Clayton Mfg. Co., El Monte, Calif.
Clayton & Lambert Mfg. Co., Louisville, Ky.
Cleaver-Brooks Co., Milwaukee, Wis.
Copper Boiler & Heater Wks., Manitowoc, Wis.
Crane Co., Chicago, Ill.
Day & Night Div., Affiliated Gas Equipment, Inc., Monrovia, Calif.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
Dewey-Shepard Boiler Co., Indianapolis, Ind.
Duo-Therm Div., Motor Wheel Corp., Lansing, Mich.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Hanson-Gates Mfg. Co., Inc., Reading, Mass.
Heat Equipment, Not Inc., Chicago, Ill.
Hook & Ackerman, Inc., New York, N. Y.
Hotstream Heater Co., Cleveland, O.
Iron Fireman Mfg. Co., Cleveland, O.
Kehm Corp., The, Chicago, Ill.
McIntyre Engineering Co., Inc., South San Francisco, Calif.
Mission Appliance Corp., Hawthorne, Calif.
Montgomery Bros., San Francisco, Calif.
Mt. Hawley Mfg. Co., Inc., Peoria, Ill.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Mund Boilers, Inc., Los Angeles, Calif.
Norse Boiler Co., Inc., New Market, N. J.
Pacific Steel Boiler Div., United States Radiator Corp., Detroit, Mich.
Pittsburg Water Heater Co., Pittsburgh, Pa.
Rheem Mfg. Co., New York, N. Y.
Rite Engineering & Mfg. Corp., Los Angeles, Calif.
Ruud Mfg. Co., Pittsburgh, Pa.
Schoedinger, F. O., Columbus, O.
Sellers Engineering Co., Chicago, Ill.
Servel, Inc., Evansville, Ind.
Smith Co., Inc., H. B., The, Westfield, Mass.
Smith Corp., A. O., Milwaukee, Wis.
Stout & Sons, David, St. Louis, Mo.
Sullivan Valve & Engineering Co., Butte, Mont.
United States Radiator Corp., Detroit, Mich.
Viking Mfg. Corp., Cleveland, O.
Wood Co., John, Conshohocken, Pa.
York-Shipley, Inc., York, Pa.

HEATERS, WATER, INDIRECT

American District Steam Co., Inc., North Tonawanda, N. Y.
American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Bell & Gossett Co., Morton Grove, Ill.
Birchfield Boiler, Inc., Tacoma, Wash.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O.
Copper Boiler & Heater Wks., Manitowoc, Wis.
Davis Engineering Corp., Elizabeth, N. J.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Ferguson & Lange Foundry Co., Chicago, Ill.
General Fittings Co., Providence, R. I.
General Heaters & Regulators Co., East Chicago, Ind.
Graham Mfg. Co., Inc., New York, N. Y.
Hook & Ackerman, Inc., New York, N. Y.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Kehm Corp., The, Chicago, Ill.
Lewis & Co., Joseph E., Baltimore, Md.
Lindy Heaters, Inc., New York, N. Y.
Manning & Lewis Engineering Co., Newark, N. J.
National Radiator Co., The, Johnstown, Pa.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Rite Engineering & Mfg. Corp., Los Angeles, Calif.
Sellers Engineering Co., Chicago, Ill.
Sims Co., Erie, Pa.
Taco Heaters, Inc., Providence, R. I.
Thrush & Co., H. A., Peru, Ind.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Western Blower Co., Seattle, Wash.
Whitlock Mfg. Co., Hartford, Conn.
Yula Water Heaters, Inc., New York, N. Y.

HEATERS, WATER, INDIRECT, COMBINATION TANK AND TANKLESS

American District Steam Co., Inc., North Tonawanda, N. J.
Bell & Gossett Co., Morton Grove, Ill.
Birchfield Boiler, Inc., Tacoma, Wash.
Burnham Corp., Boiler Div., Irvington, N. Y.
Carpenter Heating & Stoker Co., Cleveland, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Crotty Mfg. Corp., Long Island, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Eclipse Fuel Engineering Co., Rockford, Ill.
General Fittings Co., Providence, R. I.
General Heaters & Regulators Co., East Chicago, Ind.
Hook & Ackerman, Inc., New York, N. Y.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Lindy Heaters, Inc., New York, N. Y.

Manning & Lewis Engineering Co., Newark, N. J.
Penberthy Injector Co., Detroit, Mich.
Richmond Engineering Co., Inc., Richmond, Va.
Sims Co., Erie, Pa.
Taco Heaters, Inc., Providence, R. I.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Western Blower Co., Seattle, Wash.
Whitlock Mfg. Co., Hartford, Conn.
Yula Water Heaters, Inc., New York, N. Y.

HEATERS, WATER, OIL FIRED

Air Devices, Inc., New York, N. Y.
Aldrich Co., Wyoming, Ill.
Alstrom Corp., Bronx, N. Y.
Auburn Burner Co., Auburn, Ind.
Bock Corp., Madison, Wis.
Brown Products Co., Forest Hills, N. Y.
Burnham Corp., Boiler Div., Irvington, N. Y.
Bryan Steam Corp., Peru, Ind.
Century Engineering Corp., Cedar Rapids, Ia.
Clayton Mfg. Co., El Monte, Calif.
Cleaver-Brooks Co., Milwaukee, Wis.
Copper Boiler & Heater Wks., Manitowoc, Wis.
Dewey-Shepard Boiler Co., Indianapolis, Ind.
Duo-Therm Div., Motor Wheel Corp., Lansing, Mich.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Electrol Burner Mfg. Co., Inc., Rutherford, N. J.
Fitzgibbons Boiler Co., Inc., New York, N. Y.
Hanson-Gates Mfg. Co., Inc., Reading, Mass.
Heat Equipment, Not Inc., Chicago, Ill.
Hotstream Heater Co., Cleveland, O.
Johnson Co., S. T., Bridgeport, Pa.
Mt. Hawley Mfg. Co., Inc., Peoria, Ill.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Mund Boilers, Inc., Los Angeles, Calif.
Norse Boiler Co., Inc., New Market, N. J.
Nu-Way Corp., The, Rock Island, Ill.
Pacific Steel Boiler Div., United States Radiator Corp., Detroit, Mich.
Petro, 3170 W. 106th St., Cleveland, O.
Portmar Boiler Co., Inc., Brooklyn, N. Y.
Preferred Utilities Mfg. Corp., New York, N. Y.
Ray Oil Burner Co., San Francisco, Calif.
Reif-Rexoil, Inc., Buffalo, N. Y.
Rheem Mfg. Co., New York, N. Y.
Rite Engineering & Mfg. Corp., Los Angeles, Calif.
Shephard Heater Co., Inc., Terre Haute, Ind.
Smith Co., Inc., H. B., The, Westfield, Mass.
Sullivan Valve & Engineering Co., Butte, Mont.
United States Radiator Corp., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.
Viking Mfg. Corp., Cleveland, O.

HEATERS, WATER, STEAM, INSTANTANEOUS

Aerco Corp., Englewood, New Jersey
Alstrom Corp., Bronx, N. Y.
American District Steam Co., Inc., North Tonawanda, N. Y.
American Locomotive Co., Alco Products Div., Dunkirk, N. Y.
Bell & Gossett Co., Morton Grove, Ill.
Coe Mfg. Co., Painesville, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fitzgibbons Boiler Co., Inc., New York, N. Y.
General Fittings Co., Providence, R. I.
General Heaters & Regulators Co., East Chicago, Ind.
Gerstein & Cooper Co., Inc., South Boston, Mass.
Graham Mfg. Co., Inc., New York, N. Y.
Hasco Valve & Machine Co., Milwaukee, Wis.
Howard Iron Wks. & Alberger Heater Div., Buffalo, N. Y.
Johnson Corp., The, Three Rivers, Mich.
Kewanee-Ross Corp., Kewanee, Ill.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Lewis & Co., Joseph E., Baltimore, Md.
Lindy Heaters, Inc., New York, N. Y.
Manning & Lewis Engineering Co., Newark, N. J.
Marion Machine Foundry & Supply Co., Marion, Ind.
Montgomery Bros., San Francisco, Calif.
National Pipe Bending Co., New Haven, Conn.
O'Brien Steam Specialty Co., Inc., Syracuse, N. Y.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Pick Mfg. Co., West Bend, Wis. (direct steam injection)
Richmond Engineering Co., Inc., Richmond, Va.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Screw Machine Products Co., Portland, Ore.
Sims Co., Erie, Pa.
Swartwout Co., The, Cleveland, O.
Taco Heaters, Inc., Providence, R. I.
Whitlock Mfg. Co., Hartford, Conn.
Yula Water Heaters, Inc., New York, N. Y.

HEATERS, WATER, STEAM, STORAGE

Aerco Corp., Englewood, N. J.
Alert Boiler & Mfg. Co., Detroit, Mich.
Alstrom Corp, Bronx, N. Y.
American District Steam Co., Inc., North Tonawanda, N. Y.
Bell & Gossett Co., Morton Grove, Ill.
Birchfield Boiler, Inc., Tacoma, Wash.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Burnham Corp., Boiler Div., Irvington, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Copper Boiler & Heater Wks., Manitowoc, Wis.
Dahlquist Mfg. Co., Inc., Div. of Process Engineering Inc., Somerville, Mass.
Davis Engineering Corp., Elizabeth, N. J.
Fitzgibbons Boiler Co., Inc., New York, N. Y.
General Fittings Co., Providence, R. I.
General Heaters & Regulators Co., East Chicago, Ind.
Gerstein & Cooper Co., Inc., South Boston, Mass.
Hoppes Mfg. Co., Inc., Springfield, O.
Howard Iron Wks. & Alberger Heater Div., Buffalo, N. Y.
Johnson Corp., The, Three Rivers, Mich.
Kewanee-Ross Corp., Kewanee, Ill.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Lindy Heaters, Inc., New York, N. Y.
Manitowoc Shipbuilding, Inc., Manitowoc, Wis.
Manning & Lewis Engineering Co., Newark, N. J.
Marion Machine Foundry & Supply Co., Marion, Ind.
National Pipe Bending Co., New Haven, Conn.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Penberthy Injector Co., Detroit, Mich.
Quaker City Iron Works, Philadelphia, Pa.
Richmond Engineering Co., Inc., Richmond, Va.
Schaub Engineering Co., Fred H., Chicago, Ill.
Sims Co., Erie, Pa.
Stout & Sons, David, St. Louis, Mo.
Swartwout Co., The, Cleveland, O.
Taco Heaters, Inc., Providence, R. I.
Tranter Mfg. Inc., Lansing, Mich.
Vogt Machine Co., Henry, Louisville, Ky.
Western Blower Co., Seattle, Wash.
Whitlock Mfg. Co., Hartford, Conn.
Yula Water Heaters Inc., New York, N. Y.

HEATERS, WATER, STEEL, COAL FIRED

Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Catskill Metal Works, Inc., Catskill, N. Y.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Fitzgibbons Boiler Co., Inc., New York, N. Y.
Johnston Bros., Inc., Ferrysburg, Mich.
Kewanee-Ross Corp., Kewanee, Ill.
Pacific Steel Boiler Div., United States Radiator Corp., Detroit, Mich.
Terre Haute Boiler Works, Co., Terre Haute, Ind.

HEATING BOILERS

See Boilers, Heating

HEATING COILS

See Surface, Heating

HEATING SURFACE

See Surface, Heating

HOODS, FUME DISPOSAL, LABORATORY

Kewaunee Mfg. Co., Adrian, Mich.
Sheldon Equipment Co., E. H., Muskegon, Mich.

HOISTS, PORTABLE, FOR INSTALLING HEATING, PIPING AND AIR CONDITIONING EQUIPMENT

Chisholm-Moore Hoist Div., Columbus McKinnon Chain Corp., Tonawanda, N. Y.
Coffing Hoist Co., Danville, Ill.
Detroit Hoist & Machine Co., Detroit, Mich.
Lug-All Co., The, Wynnewood, Pa.

HOSE CLAMPS

See Clamps, Hose

HOSE, FLEXIBLE, AND FITTINGS

Aero-Coupling Corp., Burbank, Calif.
Aeroquip Corp., Jackson, Mich.
American Metal Hose Branch, The American Brass Co., Waterbury, Conn.
Atlantic Metal Hose Co., Inc., New York, N. Y.
Brockway Co., Naugatuck, Conn.
Chiksan Co., Brea, Calif.
Everhot Products Co., Chicago, Ill.
Finn & Co., Inc., T. R., New York, N. Y.
Flexible Metal Hose Mfg. Co., Costa Mesa, Calif.
Flexible Tubing Corp., Guilford, Conn.
Flexonics Corp., Maywood, Ill.
Gil-Lair Products, Inc., Pasadena, Calif.
Johnson Metal Hose, Inc., Waterbury, Conn.
Marquette Coppersmithing Co., Philadelphia, Pa.
Norgren Co., C. A., Englewood, Colo.
Packless Metal Hose, Inc., New Rochelle, N. Y.
Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.
Seamlex Co., Inc., Long Island City, N. Y.
Techniflex Corp., Port Jervis, N. Y.
Titeflex, Inc., Newark, N. J.
United Metal Hose Co., Inc., Long Island City, N. Y.
Weatherhead Co., The, Cleveland, O.

Yardley Plastics Co., Columbus, O.
Zallea Brothers, Wilmington, Del.

HOSE, NON-METAL, AND FITTINGS

Aero-Coupling Corp., Burbank, Calif.
Aeroquip Corp., Jackson, Mich.
Arrowhead Rubber Co., Long Beach, Calif.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Continental Rubber Works, Erie, Pa.
De Vilbiss Co., The, Toledo, O.
Flexaust Co., New York, N. Y.
Flexible Tubing Corp., Guilford, Conn.
Gates Rubber Co., The, Denver, Colo.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Hamilton Rubber Mfg. Corp., Trenton, N. J.
Henry Valve Co., Melrose Park, Ill.
New York Belting & Packing Co., Passaic, N. J.
Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Republic Rubber Div., Lee Rubber and Tire Corp., Youngstown, O.
Resistoflex Corp., Belleville, N. J.
Roylyn, Inc., Glendale, Calif.
Snap-Tite, Inc., Union City, Pa.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Techniflex Corp., Port Jervis, N. Y.
Thermoid Co., Trenton, N. J.
Thor Power Tool Co., Aurora, Ill.
United States Rubber Co., New York, N. Y.
Weatherhead Co., The, Cleveland, O.

HOSE, VENTILATING

See Ducts and Duct Fittings, Prefabricated, Non-Metallic

HOSPITAL OPERATING ROOM AIR CONDITIONING UNITS

See Units, Air Conditioning, Exclusively for Hospital Operating Rooms

HOT GAS DEFROSTING

See Systems, Hot Gas Defrosting for Refrigeration

HOT WATER HEATING SYSTEMS

See Systems, Heating, Hot Water

HOT WATER HEATING SYSTEMS, BALANCING ELBOWS FOR

See Elbows, Balancing, For Hot Water Heating System

HOT WATER PRESSURE REGULATORS

See Regulators, Pressure, Hot Water Heating Systems

HOUSINGS, FAN, CENTRIFUGAL

(Housing only—not complete fans)

Bishop & Babcock Mfg. Co., Cleveland, O.
Champion Blower & Forge Co., Lancaster, Pa.
Cincinnati Metalcrafts Inc., Cincinnati, O.
Clarage Fan Co., Kalamazoo, Mich.
Commercial Shearing & Stamping Co., Youngstown, O.
Detroit Stamping Co., Detroit, Mich.
General Blower Co., Morton Grove, Ill.
Hastings Air Conditioning Co., Hastings, Neb.
Haveg Corp., Newark, Del. (plastic for corrosive fumes)
Lau Blower Co., Dayton, O.
Martin Fan & Blower Co., Chicago, Ill.
Maysteel Products, Inc., Milwaukee, Wis.
Northern Blower Co., Cleveland, O.
Palmer Mfg. Corp., Phoenix, Ariz.
Revcor, Carpentersville, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.
Torit Mfg. Co., St. Paul, Minn.
United States Air Conditioning Corp., Minneapolis, Minn.
Utica Products, Inc., Utica, N. Y.
Utility Fan Corp., Div. of Utility Appliance Corp., Los Angeles, Calif.

HOUSINGS, FAN, PROPELLER

(Housings only—not complete fans)

Allen Ventilator Div., Production Planning Co., Rochester, Mich.
Barnes Co., A. D., Dayton, O.
Cincinnati Metalcrafts Inc., Cincinnati, O.
Circulators & Devices Mfg. Corp., Brooklyn, N. Y.
Commercial Shearing & Stamping Co., Youngstown, O.
De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Haveg Corp., Newark, Del. (plastic for corrosive fumes)
Martin Fan & Blower Co., Chicago, Ill.
Palmer Mfg. Corp., Phoenix, Ariz.
Schwitzer-Cummins Co., Indianapolis, Ind.

HUMIDIFIERS, CENTRAL PLANT

Air & Refrigeration Corp., New York, N. Y.
American Blower Corp., Detroit, Mich.
American Foundry & Furnace Co., Bloomington, Ill.
American Moistening Co., Providence, R. I.
American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Armstrong Machine Wks., Three Rivers, Mich.
Bahnson Co., Winston-Salem, N. C.
Barber-Colman Co., Rockford, Ill.
Buensod-Stacey, Inc., New York, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
Cleveland Humidifier Co., Cleveland, O.
Farr Co., Los Angeles, Calif.
Grinnell Co., Inc., Providence, R. I.
Johnson Service Co., Milwaukee, Wis.
Little Giant Vaporizer Co., Inc., Oklahoma City, Okla. (vaporizers for humidifiers)
McDonnell & Miller, Inc., Chicago, Ill.
Mellish & Murray Co., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
National Air Conditioning Inc., Johnstown, Pa.
National Engineering & Mfg. Co., Kansas City, Mo.
Niagara Blower Co., New York, N. Y.
Parks-Cramer Co., Fitchburg, Mass.
Powers Regulator Co., Skokie, Ill.
Roberson Co., L. N., Seattle, Wash.
Surface Combustion Corp., Toledo, O.
Trane Co., The, LaCrosse, Wis.
Vilter Mfg. Co., Milwaukee, Wis.
York Corp., York, Pa.

HUMIDIFIERS, DIRECT, SPRAY HEAD

Abbeon Supply Co., Jamaica, N. Y.
American Moistening Co., Providence, R. I.
Anetsberger Bros., Inc., Northbrook, Ill.
Bahnson Co., Winston-Salem, N. C. (Centrifugal)
Binks Mfg. Co., Chicago, Ill.
Blower Application Co., Milwaukee, Wis.
Buffalo Forge Co., Buffalo, N. Y.
Drying Systems, Inc., Chicago, Ill.
Grinnell Co., Inc., Providence, R. I.
Maid-O'Mist, Inc., Chicago, Ill.
Marlo Coil Co., St. Louis, Mo.
Murray Mfg. Co., D. J., Wausau, Wis.
Paasche Airbrush Co., Chicago, Ill.
Parks-Cramer Co., Fitchburg, Mass.
Pfening Co., Fred D., Columbus, O.
Rhode Island Humidifier & Ventilating Co., Boston, Mass.
Roberson Co., L. N., Seattle, Wash.
Ross Sprinkler Co., Pasadena, Calif.
Somers, Inc., H. J., Detroit, Mich.
Spray Engineering Co., Somerville, Mass.
Spraying Systems Co., Bellwood, Ill.
Supreme Electric Products Corp., Rochester, N. Y.
Trane Co., The, LaCrosse, Wis.
Water Cooling Corp., New York, N. Y.

HUMIDIFIERS FOR RADIATORS AND CONVECTORS

Kauffman Air Conditioning Corp., St. Louis, Mo.
Maid-O'-Mist, Inc., Chicago, Ill.
Skilbeck Mfg. Co., Kenosha, Wis.

HUMIDIFIERS, RADIATOR VENT VALVE

G & H Mfg. Co., Philadelphia, Pa.
Maid-O'Mist, Inc., Chicago, Ill.
Skilbeck Mfg. Co., Kenosha, Wis.

HUMIDIFIERS, UNIT, ROOM TYPE (Without Heating)

Abbeon Supply Co., Jamaica, N. Y.
American Moistening Co., Providence, R. I.
Armstrong Machine Wks., Three Rivers, Mich.
Associated Mills, Chicago, Ill.
Bahnson Co., Winston-Salem, N. C.
Crowell & Dunn, Inc., New York, N. Y.
Daffin Mfg. Co., Lancaster, Pa.
Fresh'nd-Aire Co., Div. of Cory Corp., Chicago, Ill.
Grinnell Co., Inc., Providence, R. I.
Health Trola Div., Excel Heating & Air Conditioning Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Little Giant Vaporizer Co., Inc., Oklahoma City, Okla.
Murray Mfg. Co., D. J., Wausau, Wis.
National Engineering & Mfg. Co., Kansas City, Mo.
Palmer Mfg. Corp., Phoenix, Ariz.
Somers, Inc., H. J., Detroit, Mich.
Spraying Systems Co., Bellwood, Ill.
Standard Engineering Wks., Pawtucket, R. I.
Tempmaster Corp., Kansas City, Mo.
Walton Laboratories, Inc., Irvington, N. J.
Water Cooling Corp., New York, N. Y.

HUMIDIFYING RADIATORS

See Radiators, Humidifying

HUMIDISTATS

Abbeon Supply Co., Jamaica, N. Y.
American Instrument Co., Silver Spring, Md.
American Moistening Co., Providence, R. I.
Bahnson Co., Winston-Salem, N. C.

Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
General Controls Co., Glendale, Calif., and Skokie, Ill.
Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Parks-Cramer Co., Fitchburg, Mass.
Penn Controls, Inc., Goshen, Ind.
Powers Regulator Co., Skokie, Ill.
Standard Engineering Wks., Pawtucket, R. I.
Walton Laboratories, Inc., Irvington, N. J.

HUMIDITY INDICATORS

See Indicator-Controllers, Relative Humidity; Psychrometers

HUMIDITY RECORDERS

See Recorders, Humidity

HUMIDITY AND TEMPERATURE CONTROLS

See Humidistats; Recorder-Controllers; Thermostats

HYDRAULIC PIPE PUSHERS

See Pushers, Pipe, Hydraulic

HYDRAULIC SPEED CHANGERS

See Changers, Speed, Hydraulic Coupling

HYGROMETERS

American Instrument Co., Inc., Silver Spring, Md.
American Moistening Co., Providence, R. I.
Bristol Co., The, Waterbury, Conn.
Daigger & Co., A., Chicago, Ill.
Fee and Stemwedel, Inc., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
G. M. Mfg. Co., New York, N. Y.
Garden City Instruments, Inc., Chicago, Ill.
General Scientific Equipment Co., Philadelphia, Pa.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hill & Co., E. Vernon, Lake Geneva, Wis.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.
Will Corp., Rochester, N. Y.

HYGROSTATS

See Humidistats

IDENTIFICATION MARKERS (For Piping Services)

Brady Co., W. H., Milwaukee, Wis.
Western Lithograph Co., Los Angeles, Calif.
Wilmington Plastics, Inc., Wilmington, Del.

IMMERSION THERMOSTATS

See Thermostats, Immersion

INCINERATORS, FOR LARGE BUILDINGS

Gober Incinerator Corp., Chicago, Ill.
Plibrico Co., Chicago, Ill.

INDICATING THERMOMETERS

See Thermometers, Indicating

INDICATOR-CONTROLLERS, PRESSURE

Automatic Control Co., St. Paul, Minn.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Cooper Co., Clark, Palmyra, N. J.
Davis Regulator Co., Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Garden City Instruments, Inc., Chicago, Ill.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Kieley & Mueller, Inc., Middletown, N. Y.
Mason-Neilan Regulator Co., Boston, Mass.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Moore Products Co., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Scientific Instrument Co., Detroit, Mich.
Shallcross Controls, Inc., Milwaukee, Wis.
Swartwout Co., The, Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.

INDICATOR-CONTROLLERS, RELATIVE HUMIDITY

American Instrument Co., Inc., Silver Spring, Md.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Garden City Instruments, Inc., Chicago, Ill.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Scientific Instrument Co., Detroit, Mich.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.

INDICATOR-CONTROLLERS, TEMPERATURE

American Instrument Co., Inc., Silver Spring, Md.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Cooper Co., Clark, Palmyra, N. J.
Dickson Co., The, Chicago, Ill.
Fielden Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Garden City Instruments, Inc., Chicago, Ill.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Mason-Neilan Regulator Co., Boston, Mass.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Moore Products Co., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
Sarco Co., Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Smith Control & Instrument Corp., Palmyra, N. J.
Swartwout Co., The Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
United Electric Controls Co., Watertown, Mass.
Weksler Thermometer Corp., New York, N. Y.
West Instrument Corp., Chicago, Ill.
Weston Electrical Instrument Corp., Newark, N. J.
Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.
Wiegand Co., Edwin L., Pittsburgh, Pa.

INDICATORS, CARBON DIOXIDE, BOILER ROOM

For Portable CO_2 Analyzers, See Analyzers, Carbon Dioxide, Portable

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Davis Instruments, Div. of Davis Emergency Equipment Co., Inc., Newark, N. J.
Defender Instrument and Regulator Co., St. Louis, Mo.
Engelhard, Inc., Chas., Newark, N. J.
Ess Instrument Co., Bergenfield, N. J.
General Power Plant Corp., Ossining, N. Y.
General Scientific Equipment Co., Philadelphia, Pa.
Hays Corp., Michigan City, Ind.
Permutit Co., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.

INDICATORS, DEW POINT

American Instrument Co., Inc., Silver Spring, Md.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Pittsburgh Lectrodryer Corp., Pittsburgh, Pa.

INDICATORS, FLOW

See Meters, Flow

INDICATORS, LIQUID LEVEL, BOILER AND TANK

Automatic Control Co., St. Paul, Minn.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Barton Instrument Corp., Los Angeles, Calif.
Boston Auto Gage Co., Pittsfield, Mass.
Bristol Co., The, Waterbury, Conn.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
B/W Controller Corp., Birmingham, Mich.
Cochrane Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Defender Instrument & Regulator Co., St. Louis, Mo.
Detroit Brass & Malleable Works, Detroit, Mich.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Frick Co., Waynesboro, Pa.
Gasoilair Equipment Co., New Haven, Conn.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Healy Ruff Co., St. Paul, Minn.
Liquidepth Indicators, Inc., Long Island City, N. Y.
Magnetrol, Inc., Chicago, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
McDonnell & Miller, Inc., Chicago, Ill.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Moore Products Co., Philadelphia, Pa.
Newark Controls Co., Bloomfield, N. J.
Penberthy Injector Co., Detroit, Mich.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Reliance Gauge Column Co., Cleveland, O.
Ripley Co., Inc., Middletown, Conn.
Rochester Mfg. Co., Inc., Rochester, N. Y.
Swift Lubricator Co., Inc., Elmira, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
Yarnall-Waring Co., Philadelphia, Pa.

INDICATORS, pH

American Instrument Co., Inc., Silver Spring, Md.
Analytical Measurements, Inc., Chatham, N. J.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Leeds & Northrup Co., Philadelphia, Pa.
Madden Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Photovolt Corp., New York, N. Y.
Thomas Co., Arthur H., Philadelphia, Pa.
Thwing-Albert Instrument Co., Philadelphia, Pa.

INDICATORS, RELATIVE HUMIDITY

American Instrument Co., Inc., Silver Spring, Md.
American Moistening Co., Providence, R. I.
Fee and Stemwedel, Inc., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Garden City Instruments, Inc., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
Walton Laboratories, Inc., Irvington, N. J.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.

INDICATORS, SOUND LEVEL

General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hermon Hosmer Scott, Inc., Cambridge, Mass.

INDIRECT HEATING SURFACE

See Surface, Heating

INDIRECT WATER HEATERS

See Heaters, Water, Indirect

INDUSTRIAL AIR CONDITIONERS

See Units, Air Conditioning, Industrial Type

INDUSTRIAL DRYERS

See Dryers, Industrial

INJECTOR RECIRCULATORS FOR REFRIGERANTS

Phillips & Co., H. A., Chicago, Ill.

INSERTS, CONCRETE

Carty & Moore Engineering Co., Detroit, Mich.
Healy Ruff Co., St. Paul, Minn.
Hupp Corp., Globe Stamping Div., Cleveland, O.
Leibfried Mfg. Corp., C. H., Brooklyn, N. Y.
Rockwood Sprinkler Co., Worcester, Mass.
Truscon Steel Div., Republic Steel Corp., Youngstown, O.
Unistrut Products Co., Chicago, Ill.

INSTANTANEOUS WATER HEATERS

See Heaters, Water, Steam, Instantaneous

INSULATING CONCRETE

See Concrete, Insulating

INSULATION ANCHORS AND ADHESIVES

See Fasteners, Insulation

INSULATION, BOILER AND TANK

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Alton Mineral Wool Insulation Co., St. Louis, Mo.
Armstrong Cork Co., Lancaster, Pa. (85% Magnesia)
Asbestos Asphalt Insulation Co., Chicago, Ill.
Badham Insulation Co., Inc., Birmingham, Ala.
Baldwin-Hill Co., Trenton, N. J. (Rock wool)
Bigelow Liptak Corp., Detroit, Mich.
Bird-Archer Co., Philadelphia, Pa.
Botfield Refractories Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Chicago Fire Brick Co., Chicago, Ill.
Eagle-Picher Co., Cincinnati, O.
Ehret Magnesia Mfg. Co., Valley Forge, Pa. (Magnesia)
Forty-Eight Insulations, Inc., Aurora, Ill.
Glass Fibers, Inc., Toledo, O.
Grant Wilson Inc., Chicago, Ill.
Green Fire Brick Co., Mexico, Mo.
Insul-Mastic Corp., Pittsburgh, Pa.
International Vermiculite Co., Girard, Ill.
Johns-Manville, New York, N. Y.
Kaylo Div., Owens-Illinois Glass Co., Toledo, O.
Keasbey Co., Robert A., New York, N. Y. (Asbestos)
Keasbey & Mattison Co., Ambler, Pa.
Krehbiel Co., J. H., Chicago, Ill.
Laclede-Christy Co., St. Louis, Mo.
Libbey-Owens-Ford Glass Co., Toledo, O.
Lockport Cotton Batting Co., Lockport, N. Y.
Monsanto Chemical Co., Merimac Div., Boston, Mass.
Mundet Cork Corp., North Bergen, N. J. (Cork)
Munn and Steele, Inc., South Boston, Mass.
National Cork Co., Englewood, N. J. (Corkboard)
National Gypsum Co., Buffalo, N. Y. (Rock wool)
Norristown Magnesia & Asbestos Co., Norristown, Pa. (Asbestos and magnesia)
Owens-Corning Fiberglas Corp., Toledo, O. (Board)
Pabco Products Inc., San Francisco, Calif.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Pittsburgh Corning Corp., Pittsburgh, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Plibrico Co., Chicago, Ill.
Poe Co., C. W., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Reflectal Corp., New York, N. Y.
Refractory & Insulation Corp., New York, N. Y. (Blanket, block, cement)
Robinson Industries, Coleman, Mich. (expanded plastic)
Ruberoid Co., New York, N. Y. (Asbestos, magnesia)
Sall Mountain Co., Hamilton, O.
Schundler & Co., Inc., F. E., Long Island City, N. Y.
Smith & Kanzler Corp., Linden, N. J.
Spring Packing Corp., Chicago, Ill.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Fuel Engineering Co., Detroit, Mich.
Telsit Insulation Co., Bronx, N. Y.
Union Asbestos & Rubber Co., Chicago, Ill.
United Cork Co., Kearney, N. J. (Cork)
United States Mineral Wool Co., Stanhope, N. J.
Walker Jamar Co., Duluth, Minn.
Western Mineral Products Co., Minneapolis, Minn.
Zonolite Co., Chicago, Ill. (plastic)

INSULATION, BUILDING

Acme Asbestos Covering & Flooring Co., Chicago, Ill. (Rock wool)
Air-O-Cel Co., Detroit, Mich.

Alton Mineral Wool Insulation Co., St. Louis, Mo.
American Flange & Mfg. Co., Inc., New York, N. Y. (Metal sheets)
Armstrong Cork Co., Lancaster, Pa. (Corkboard, fibre board)
Bache & Co., Semon, New York, N. Y. (Glass wool)
Badham Insulation Co., Inc., Birmingham, Ala.
Baldwin-Hill Co., Trenton, N. J. (Rock wool)
Barrett Div., Allied Chemical & Dye Corp., New York, N. Y.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O. (Rock wool)
Carney Co., Inc., The, Mankato, Minn.
Celotex Corp., The, Chicago, Ill.
Certain-teed Products Corp., Ardmore, Pa.
Chamberlin Co. of America, Detroit, Mich.
Cork Insulation Co., Inc., New York, N. Y. (Corkboard)
Dodge Cork Co., Inc., Lancaster, Pa.
Eagle-Picher Co., Cincinnati, O. (Mineral wool, blankets, batts, granulated, loose)
Fir-tex Insulating Board Co., St. Helens, Ore. (Wood fibre-board)
Flintkote Co., The, New York, N. Y. (Glass wool)
Forty-Eight Insulations, Inc., Aurora, Ill.
General Insulating Products Co., Brooklyn, N. Y. (Rock wool)
Glass Fibers, Inc., Toledo, O.
Gustin-Bacon Mfg. Co., Kansas City, Mo.
Hogan & Co.. Inc., C. T., New York, N. Y. (reflective)
Infra Insulation, Inc., New York, N. Y. (reflective)
Insulite Div. Minnesota and Ontario Paper Co., Minneapolis, Minn. (Wool fibre)
International Vermiculite Co., Girard, Ill. (Loose fill)
Isoflex Corp., San Francisco, Calif.
Johns-Manville, New York, N. Y. (Rock wool and wood fibre-board)
Johnston Foil Mfg. Co., St. Louis, Mo. (Foil, aluminum, tin, lead)
Kimberly-Clark Corp., Neenah, Wis.
Libbey-Owens-Ford Glass Co., Toledo, O.
Lockport Cotton Batting Co., Lockport, N. Y.
Masonite Corp., Chicago, Ill. (Blanket)
Mineral Insulation Co., Chicago Ridge, Ill. (Rock wool)
Multi-Cell Sales Corp., Minneapolis, Minn. (Blanket, quilted newspaper)
Mundet Cork Corp., North Bergen, N. J. (Cork)
Munn & Steele, Inc., South Boston, Mass.
National Cork Co., Englewood, N. J. (Corkboard)
National Gypsum Co., Buffalo, N. Y.
Nelson Mfg. Co., B. F., Minneapolis, Minn.
Owens-Corning Fiberglas Corp., Toledo, O.
Pacific Lumber Co., The, San Francisco, Calif.
Pittsburgh Corning Corp., Pittsburgh, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Plastergon Wall Board Co., Buffalo, N. Y. (Rigid board)
Poe Co., C. W., Cleveland, O.
Rector Insulations, New York, N. Y.
Reflectal Corp., New York, N. Y.
Refractory & Insulation Corp., New York, N. Y. (Rock, slag wool)
Reynolds Metals Co., Louisville, Ky.
Rubatex Div., Great American Industries, Inc., Bedford, Va.
Russell Co., F. C., The, Cleveland, O.
Silvercote Products, Inc., Chicago, Ill.
Sprayo-Flake Co., Chicago, Ill.
Standard Asbestos Mfg. Co., Chicago, Ill. (Asbestos, hairfelt)
Tectum Corp., Newark, O. (insulated roof deck)
Tennessee Products and Chemical Corp., Nashville, Tenn.
United Cork Companies, Kearny, N. J. (Cork)
United States Gypsum Co., Chicago, Ill. (Wool and board)
United States Mineral Wool Co., Stanhope, N. J. (Mineral wool)
Universal Gypsum & Lime Co., Chicago, Ill. (Loose fill)
Western Mineral Products Co., Minneapolis, Minn.
Wilson & Co., Inc., Chicago, Ill. (Board)
Wood Conversion Co., St. Paul, Minn.
Zonolite Co., Chicago, Ill. (Loose fill)

INSULATION, DUCT, SOUND DEADENING

For Application Inside Duct

American Hair & Felt Co., Chicago, Ill.
Baldwin-Hill Co., Trenton, N. J.
Celotex Corp., The, Chicago, Ill.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Felters Company, The, Boston, Mass.
Flintkote Co., The, New York, N. Y.
Glass Fibers, Inc., Toledo, O.
Grant Wilson, Inc., Chicago, Ill.
Gustin-Bacon Mfg. Co., Kansas City, Mo.
Industrial Acoustics Co., New York, N. Y.
Industrial Sound Control, Inc., Hartford, Conn.
Insulite Div., Minnesota and Ontario Paper Co., Minneapolis, Minn.
Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y.
Kimberly-Clark Corp., Neenah, Wis.
Lockport Cotton Batting Co., Lockport, N. Y.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Mortell Co., J. W., Kankakee, Ill.
Owens-Corning Fiberglas Corp., Toledo, O.
Sprayo-Flake Co., Chicago, Ill.
Telsit Insulation Co., Bronx, N. Y.
Thompson and Co., Oakmont, Pa.
United States Rubber Co., New York, N. Y.
Western Felt Works, Chicago, Ill.
Zonolite Co., Chicago, Ill.

INSULATION, DUCT, THERMAL

Acme Asbestos Covering & Flooring Co., Chicago, Ill. (Asbestos)
Air-O-Cel Co., Detroit, Mich.
American Flange & Mfg. Co., Inc., New York, N. Y.
American Hair & Felt Co., Chicago, Ill. (Hair felt)
Armstrong Cork Co., Lancaster, Pa. (Corkboard)
Badham Insulation Co., Inc., Birmingham, Ala.
Baldwin-Hill Co., Trenton, N. J.
Bigelow Liptak Corp., Detroit, Mich.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O. (Asbestos)
Celotex Corp., The, Chicago, Ill.
Cork Insulation Co., Inc., New York, N. Y. (Corkboard)
Dodge Cork Co., Inc., Lancaster, Pa.
Eagle-Picher Co., Cincinnati, O. (Mineral wool blankets)
Ehret Magnesia Mfg. Co., Valley Forge, Pa. (Cork, magnesia, hair felt)
Felters Company, The, Boston, Mass. (Wool felt)
Fir-Tex Insulating Board Co., St. Helens, Ore. (Wood fibreboard)
Flintkote Co., The, New York, N. Y. (fibrated, asphalt spray-On)
Forty-Eight Insulations, Inc., Aurora, Ill.
General Insulating Products Co., Brooklyn, N. Y. (Acoustic rock wool)
Glass Fibers, Inc., Toledo, O.
Grant Wilson Inc., Chicago, Ill.
Gustin-Bacon Mfg. Co., Kansas City, Mo.
Hinde & Dauch Paper Co., Sandusky, O.
Infra Insulation, Inc., New York, N. Y.
Insulite Div. Minnesota and Ontario Paper Co., Minneapolis, Minn. (Wood fibre)
International Vermiculite Co., Girard, Ill. (Block)
Isoflex Corp , San Francisco, Calif.
Johns-Manville, New York, N. Y. (Rock cork, asbestos)
Kaylo Div., Owens-Illinois Glass Co., Toledo, O.
Keasbey Co., Robert A., New York, N. Y. (Asbestos and cork)
Keasbey & Mattison Co., Ambler, Pa. (Asbestos)
Kimberly-Clark Corp., Neenah, Wis.
Libbey-Owens-Ford Glass Co., Toledo, O.
Lockport Cotton Batting Co., Lockport, N. Y.
Masonite Corp., Chicago, Ill.
Mineral Insulation Co., Chicago Ridge, Ill. (Rock wool)
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Mortell Co., J. W., Kankakee, Ill.
Mundet Cork Corp., North Bergen, N. J. (Cork)
Munn and Steele, Inc., South Boston, Mass.
National Cork Co., Englewood, N. J. (Corkboard)
Norristown Magnesia & Asbestos Co., Norristown, Pa. (Asbestos and wool felt)
Owens-Corning Fiberglas Corp., Toledo, O. (Blanket)
Pabco Products Inc., San Francisco, Calif.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Pittsburgh Corning Corp., Pittsburgh, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Poe Co., C. W., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Rector Insulations, New York, N. Y.
Refractory & Insulation Corp., New York, N. Y. (Block, blanket)
Reynolds Metals Co., Louisville, Ky.
Rubatex Div., Great American Industries, Inc., Bedford, Va.
Ruberoid Co., New York, N. Y. (Asbestos cellular and laminated sheets or blocks)
Sall Mountain Co., Hamilton, O. (Asbestos)
Schundler & Co., Inc., F. E., Long Island City, N. Y.
Smith & Kanzler Corp., Linden, N. J. (Asbestos air cell type)
Sprayo-Flake Co., Chicago, Ill.
Spring Packing Corp., Chicago, Ill.
Standard Asbestos Mfg. Co., Chicago, Ill. (Asbestos, hair felt)
Telsit Insulation Co., Bronx, N. Y.
United Cork Companies, Kearny, N. J. (Cork)
United States Mineral Wool Co., Stanhope, N. J.
Western Felt Wks., Chicago, Ill. (Felt)
Wilson & Co., Inc., Chicago, Ill.
Zonolite Co., Chicago, Ill. (plastic)

INSULATION FASTENERS AND ANCHORS

See Fasteners, Insulation

INSULATION, FINISHING CEMENT

Baldwin-Hill Co., Trenton, N J.
Chicago Fire Brick Co., Chicago, Ill.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Forty-Eight Insulations, Inc., Aurora, Ill.
Grant Wilson, Inc., Chicago, Ill.
Keasbey Co., Robert A., New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Ruberoid Co., New York, N. Y.
Sall Mountain Co., Hamilton, O.
Standard Asbestos Mfg. Co., Chicago, Ill.

INSULATION, PIPE

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
American Gilsonite Co., Salt Lake City, Utah (hot, underground)
American Hair & Felt Co., Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa. (Cork, 85% mag, air cell, Hy-Temp.)
Asbestos Asphalt Insulation Co., Chicago, Ill.
Badham Insulation Co., Inc., Birmingham, Ala.
Baldwin-Hill Co., Trenton, N. J. (Rock wool)

Bigelow Liptak Corp., Detroit, Mich.
Canvas Products Co., St. Louis, Mo. (canvas drill pipe wrapping)
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O. (Asbestos, magnesia)
Cork Insulation Co., New York, N. Y. (cork)
Durant Insulated Pipe Co., Palo Alto, Calif. (Underground)
Durant International Corp., Williamstown, N. J. (underground)
Eagle-Picher Co., Cincinnati, O. (Mineral wool)
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Forty-Eight Insulations, Inc., Aurora, Ill.
Glass Fibers, Inc., Toledo, O. (glass fiber)
Grant Wilson Inc., Chicago, Ill. (85% magnesium, air-cell, woolfelt, anti-sweat, frost proof, sponge felt.)
Gro-Quick Co., Chicago, Ill. (glass fiber and flexible tape)
Gustin-Bacon Mfg. Co., Kansas City, Mo. (Molded fine glass fiber)
Hunter Mfg. Co., Mirror Insulation Div., Bristol, Pa. (reflective)
International Vermiculite Co., Girard, Ill. (Vermiculite)
Johns-Manville, New York, N. Y. (Asbestos, magnesia, rock cork)
Kaylo Div., Owens-Illinois Glass Co., Toledo, O.
Keasbey Co., Robert A., New York, N. Y. (Asbestos and cork)
Keasbey & Mattison Co., Ambler, Pa. (Asbestos, magnesia)
Lockport Cotton Batting Co., Lockport, N. Y.
Lynch Asbestos Co., Los Angeles, Calif.
Masonite Corp., Chicago, Ill.
Minnesota Mining & Mfg. Co., St. Paul, Minn. (Spray)
Mortell Co., J. W., Kankakee, Ill. (plastic cork)
Mundet Cork Corp., North Bergen, N. J. (Cork)
Munn and Steele, Inc., South Boston, Mass.
Mystik Adhesive Products, Div. of Chicago Show Printing Co., Chicago, Ill.
National Cork Co., Englewood, N. J. (Corkboard)
National Gypsum Co., Buffalo, N. Y. (Moulded)
Norristown Magnesia & Asbestos Co., Norristown, Pa. (Asbestos, magnesia)
Owens-Corning Fiberglas Corp., Toledo, O.
Pabco Products Inc., San Francisco, Calif.
Pacific States Felt Mfg. Co., Inc., San Francisco, Calif.
Pittsburgh Corning Corp., Pittsburgh, Pa.
Poe Co., C. W., Cleveland, O.
Porter & Co., Inc., H. W., Newark, N. J. (Underground)
Presstite Engineering Co., St. Louis, Mo.
Reflectal Corp., New York, N. Y. (foil and corrugated paper)
Ric-wiL Co., Barberton, O.
Robinson Industries, Coleman, Mich. (expanded plastic)
Ruberoid Co., New York, N. Y. (Asbestos, magnesia, calsilite)
Sall Mountain Co., Hamilton, O. (Asbestos and wool felt)
Smith & Kanzler Corp., Linden, N. J. (Asbestos air cell, wool felt and hair felt)
Sponge Rubber Products Co., The, Shelton, Conn. (cellular rubber)
Spring Packing Corp., Chicago, Ill. (asphaltic)
Standard Asbestos Mfg. Co., Chicago, Ill.
Union Asbestos & Rubber Co., Chicago, Ill.
United Cork Companies, Kearny, N. J.
Walker Jamar Co., Duluth, Minn.
Western Mineral Products Co., Minneapolis, Minn. (Underground)
Wilson & Co., Chicago, Ill. (hairfelt)
Wood Conversion Co., St. Paul, Minn.
Zonolite Co., Chicago, Ill. (underground)

INTAKES FOR OUTDOOR AIR, WALL OR ROOF, EQUIPPED WITH FILTERS

Muckle Mfg. Co., Owatonna, Minn.

IONIZATION APPARATUS

General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
General Ozone Corp., Chicago, Ill.
Montgomery Bros., San Francisco, Calif.
United States Ozone Co. of America, Scottdale, Pa.
Welsbach Corp., The, Ozone Processes Div., Philadelphia, Pa.
Wesix Electric Heater Co., San Francisco, Calif.

IRON BODY VALVES

See Valves, Gate; and Valves, Globe

JACKETED PIPE

See Pipe, Jacketed

JACKETING FOR PIPE INSULATION

See Protectors, Pipe Covering

JETS, OVERFIRE AIR, FOR SMOKE ABATEMENT

Canton Stoker Corp., Canton, O.
Eclipse Fuel Engineering Co., Rockford, Ill.
Iron Fireman Mfg. Co., Cleveland, O.
North American Mfg. Co., Cleveland, O.
Plibrico Co., Chicago, Ill.
Power Engineering Co., Chicago, Ill.
Reintjes Co., Geo. P., Kansas City, Mo.
Sterns-Flinn Corp., New York, N. Y.

JOINTS, PIPE, ELECTRICAL INSULATING

American Hard Rubber Co., New York, N. Y.
Barco Mfg. Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Universal Controls Corp., Dallas, Tex.

JOINTS, PIPE, EXPANSION, PACKLESS

American District Steam Co., Inc., North Tonawanda, N. Y.
Badger Fire Extinguisher Co., Somerville, Mass.
Badger Mfg. Co., Cambridge, Mass. (Corrugated copper, stainless steel)
Cook Electric Co., Chicago, Ill.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Flexonics Corp., Maywood, Ill.
Foster Wheeler Corp., New York, N. Y.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Garlock Packing Co., Palmyra, N. Y. (rubber)
Harris & Co., Arthur, Chicago, Ill.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Marquette Coppersmithing Co., Philadelphia, Pa.
National Valve & Mfg. Co., Pittsburgh, Pa.
Northern Indiana Brass Co., Elkhart, Ind.
Ric-wiL Co., The, Barberton, O.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Solar Aircraft Co., San Diego, Calif.
Techniflex Corp., Port Jervis, N. Y.
United States Rubber Co., New York, N. Y.
Walworth Co., New York, N. Y.
Webster & Co., Warren, Camden, N. J.
Zallea Brothers, Wilmington, Del.

JOINTS, PIPE, EXPANSION, SLIP

American District Steam Co., Inc., North Tonawanda, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Clow & Sons, James B., Chicago, Ill.
Crane Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Jarecki, Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Northern Indiana Brass Co , Elkhart, Ind.
Parks-Cramer Co., Fitchburg, Mass. (jacketed)
Powell Co., Wm., Cincinnati, O.
Q-P Mfg. Co., Needham Heights, Mass.
Royalton Co., Inc., Gasport, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
United States Gasket Co., Camden, N. J.
Walworth Co., New York, N. Y.
Warren Foundry & Pipe Corp., New York, N. Y.
Webster & Co., Warren, Camden, N. J.
Yarnall-Waring Co., Philadelphia, Pa.

JOINTS, PIPE, FLEXIBLE, SWING AND REVOLVING

Barco Mfg. Co., Chicago, Ill.
Bordo Co., Inc., L. J., Glenside, Pa.
Chiksan Co., Brea, Calif.
Flexo Supply Co., Inc., St. Louis, Mo.
Gil-Lair Products, Inc., Pasadena, Calif.
Johnson Corp., The, Three Rivers, Mich.
Mayson Mfg. Co., Detroit, Mich.
Moran Flexible Joint Co., Inc., Louisville, Ky.
Patterson-Ballagh Corp., Los Angeles, Calif.
Powell Co., Wm., Cincinnati, O.

JOINTS, UNIVERSAL, FOR OPERATING VALVES

Blood Brothers Machine Div., Rockwell Spring and Axle Co., Allegan, Mich.
Brooks Equipment Corp., Hoboken, N. J.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Lovejoy Flexible Coupling Co., Chicago, Ill.
Piezo Mfg. Corp., New York, N. Y.

KATA THERMOMETERS

See Thermometers, Kata

KITS, COMBUSTION TESTING

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Daigger & Co., A., Chicago, Ill.
Victory Engineering Corp., Union, N. J.

LACQUERS

See Enamels and Lacquers

LAGGING ADHESIVES

See Adhesives, for Pipe Covering

LAMPS, STERILIZING, FOR DUCT INSTALLATION

Coleman-Petterson Corp., Cleveland, O.
Cooper Hewitt Electric Co., Hoboken, N. J.
Fuller Co., D. William, Chicago, Ill.
General Electric Co., Lamp Div., Cleveland, O.
Hanovia Chemical & Mfg. Co., Newark, N. J.
Lustra Corp. of America, Brooklyn, N. Y.
Sperti, Inc., Cincinnati, O.
Westinghouse Electric Corp., Pittsburgh, Pa.

LEAD PIPE

See Pipe and Tubing, Lead and Lead Alloy

LEAD SHEETS

See Sheets, Lead

LEAD TUBING

See Pipe and Tubing, Lead and Lead Alloy

LEAK DETECTORS

See Detectors, Leak, Refrigerant

LEATHER PACKING

See Packing, Leather

LIGHTS, PILOT AND SIGNAL

Cooper Co., Clark, Palmyra, N. J.
Dialight Corp., Brooklyn, N. Y.
General Electric Co., Lamp Div., Cleveland, O.
Hart Mfg. Co., The, Hartford, Conn.
Pyle-National Co., The, Chicago, Ill.
Signal Indicator Co., Brooklyn, N. Y.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Westinghouse Electric Corp., Pittsburgh, Pa.

LINKS, FUSIBLE

Division Lead Co., Summit, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Grinnell Co., Inc., Providence, R. I.
Morse-Smith-Morse, Inc., Watertown, Mass.
Preferred Utilities Mfg. Corp., New York, N. Y.

LIQUID LEVEL GAGES

See Gages, Liquid Level

LIQUID LEVEL INDICATORS

See Indicators, Liquid Level

LIQUID LEVEL RECORDERS

See Recorders, Liquid Level

LIQUID LEVEL REGULATORS

See Regulators, Liquid Level

LIQUID PRESSURE REGULATORS

See Regulators, Pressure, Liquid

LOCATORS, PIPE, UNDERGROUND

Fisher Research Laboratory, Inc., Palo Alto, Calif.
Globe Phone Mfg. Co., Reading, Mass.
Magna-Rod, Beloit, Wisc.
Radioactive Products Inc., Detroit, Mich.
Wilkinson Products Co., Pasadena, Calif.

LOCK FORMING MACHINES

See Machines, Pittsburgh Lock Forming

LOCK NUTS

See Nuts, Lock

LOUVERS AND SHUTTERS, AUTOMATICALLY OR MANUALLY CONTROLLED

Aerovent Fan Co., Inc., Piqua, O.
Air Conditioning Products Co., Detroit, Mich.
Air & Refrigeration Corp., New York, N. Y.
Airmaster Corp., Chicago, Ill.
Allen Ventilator Div., Production Planning Co., Rochester, Mich.
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Coolair Corp., Jacksonville, Fla.
American Foundry & Furnace Co., Bloomington, Ill.
American Steel Band Co., Pittsburgh, Pa.
American Warming & Ventilating Co., Toledo, O.
Ammerman Co., C. L., Minneapolis, Minn.
Arex Co., Chicago, Ill.
Barber-Colman Co., Rockford, Ill.
Barnes Co., A. D., Dayton, O.
Belter Electric Mfg. Co., G. J., The, St. Louis, Mo.
Bern's Mfg. Corp., Chicago, Ill.
Biersach & Niedermeyer Co., Milwaukee, Wis.
Bishop & Babcock Mfg. Co., Cleveland, O.
Buensod-Stacey, Inc., New York, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Burt Mfg. Co., Akron, O.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Plainfield, N. J.
Circulators & Devices Mfg. Corp., Brooklyn, N. Y.
Commercialaire, Inc., Brooklyn, N. Y.
Conoflow Corp., Philadelphia, Pa.
Cook Co., Loren, Berea, O.
De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Decatur Iron & Steel Co., Decatur, Ala.
Dual-Air Fan Co., South Elgin, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Elgo Shutter & Mfg. Co., Detroit, Mich.
Empire Ventilation Equipment Co., Long Island City, N. Y. (stationary)
Frigid, Inc., Brooklyn, N. Y.
General Blower Co., Morton Grove, Ill.
Ilg Electric Ventilating Co., Chicago, Ill.
International Engineering, Inc., Dayton, O.
Jamieson Mfg. Co., Dallas, Tex.
Jordan & Co., Inc., Paul R., Indianapolis, Ind.
Kane Mfg. Corp., Kane, Pa.
King Co., The, Owatonna, Minn.
Lockjoint Wood Products Co., Wichita, Kans. (Wood; stationary door, wall, window and ceiling)
Martin Fan & Blower Co., Chicago, Ill.
Maysteel Products, Inc., Milwaukee, Wis.
Meier Electric & Machine Co., Inc., Indianapolis, Ind.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Muckle Mfg. Co., Owatonna, Minn.
Murray Co. of Texas, The, Atlanta, Ga.
Myers Electric Co., Inc., Pittsburgh, Pa.
Peerless Electric Co., Warren, O.
Reed Unit-Fans, Inc., New Orleans, La.
Register & Grille Mfg. Co., Brooklyn, N. Y.
Riggin Metal Products, Inc., Kankakee, Ill.
Rittling Corp., The, Buffalo, N. Y.
Robbins & Myers, Inc., Fan Div., Memphis, Tenn.
Robertson Co., H. H., Pittsburgh, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Signal Electric Mfg. Co., Menominee, Mich.
Sioux Steel Co., Sioux Falls, S. D.
Sommerfield, Inc., Lou, New York, N. Y.
Standard Stamping & Perforating Co., Chicago, Ill.
Swartwout Co., The, Cleveland, O.
Tuttle & Bailey, Inc., New Britain, Conn.
United States Gypsum Co., Chicago, Ill.
United States Register Co., Battle Creek, Mich.
Uno Ventilator Co., Malden, Mass.
Utility Appliance Corp., Los Angeles, Calif.
Van Noorden Co., E., Boston, Mass.
Wing Mfg. Co., L. J., Linden, N. J.

LOUVERS, SUN REFLECTING

Kawneer Co., Niles, Mich.

LOW WATER CUT-OFFS

See Cut-offs, Low Water, Heating Boiler

LUBRICANT, VALVE STEM

Jet-Lube, Inc., Los Angeles, Calif.

MACHINES, BALANCING

See Equipment, Balancing

MACHINES, BLUE PRINT AND WHITE PRINT

For Reproducing Engineering Drawings

American Photocopy Equipment Co., Chicago, Ill.
Bruning Co., Inc., Charles, Chicago, Ill.
Dietzgen Co., Eugene, Chicago, Ill.
Ozalid Div. of General Aniline & Film Corp., Johnson City, N. Y.
Paragon-Revolute Corp., Rochester, N. Y.
Pease Co., C. F., The, Chicago, Ill.
Peck & Harvey, Chicago, Ill.

MACHINES AND FILM, X-RAY

du Pont de Nemours & Co., E. I., Photo Products Dept., Wilmington, Del.
Eastman Kodak Co., Rochester, N. Y.
Kelley Koett Mfg. Co., The, Covington, Ky.
North American Philips Co., Inc., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.

MACHINES, FLARING, PIPE AND TUBE

Tri-Clover Machine Co., Kenosha, Wis.

MACHINES, PIPE CLEANING

American Wheelabrator & Equipment Corp., Mishawaka, Ind. (for preparation of surface prior to coating)
Continental Machine Co., Chicago, Ill.
Spartan Tool Co., Chicago, Ill.
Wilson, Inc., Thomas C., Long Island City, N. Y.

MACHINES, PIPE CUTTING AND THREADING, PORTABLE

Armstrong Bros. Tool Co., Chicago, Ill.
Beaver Pipe Tools, Inc., Warren, O.
Capewell Mfg. Co., Hartford, Conn.
Gaines-Collins, Quijada Tool Division, Los Angeles, Calif.
Landis Machine Co., Inc., Waynesboro, Pa.
Muncie Gear Wks., Inc., Muncie, Ind.
Obear & Son, W. F., Los Angeles, Calif.
Oster Mfg. Co., Cleveland, O.

Ridge Tool Co., Elyria, O. (Hand)
Thread-Ezy Mfg. Co., Corunna, Mich.
Toledo Pipe Threading Machine Co., Toledo, O.

MACHINES, PIPE CUTTING AND THREADING, STATIONARY

Bignall & Keeler Div., John Ramming Machine Co., St. Louis, Mo.
Capewell Mfg. Co., Hartford, Conn.
Gaines-Collins, Quijada Tool Division, Los Angeles, Calif.
Kalamazoo Tank & Silo Co., Machine Tool Div., Kalamazoo, Mich.
Landis Machine Co., Inc., Waynesboro, Pa.
Obear & Son, W. F., Los Angeles, Calif.
Oster Mfg. Co., Cleveland, O.
Saunders Machine & Tool Corp., Yonkers, N. Y.
Stratford Pipe Scalloper Co., Clearwater, Fla.
Toledo Pipe Threading Machine Co., Toledo, O.

MACHINES, PITTSBURGH LOCK FORMING

Birks Mfg. Co., Meridan, Conn. (Pittsburgh lock seam opener)
Lockformer Co., Chicago, Ill.
Maplewood Machinery Co., Inc., Chicago, Ill.

MACHINES, REFRIGERATION, ABSORPTION

Carrier Corp., Syracuse, N. Y.
Servel, Inc., Evansville, Ind.
Vogt Machine Co., Henry, Louisville, Ky.
Worthington Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
York Corp., York, Pa.

MACHINES, SLIP ROLL FORMING

Barth Engineering & Mfg. Co., Inc., Milldale, Conn.
Hendley & Whittmore Co., Beloit, Wis.
Kling Bros. Engineering Wks., Chicago, Ill.
Milton Equipment Co., Philadelphia, Pa.
Niagara Machine & Tool Wks., Buffalo, N. Y.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.
San Angelo Foundry & Machine Co., Mt. Vernon, Ill.
Webb Corp., The, Webb City, Mo.
Wysong & Miles, Inc., Greensboro, N. C.

MACHINES, TESTING, WELD

Air Reduction Sales Co., New York, N. Y.
Dillon Co., Inc., W. C., Van Nuys, Calif.
Olsen Testing Machine Co., Tinius, Willow Grove, Pa.

MACHINES, TUBE FINNING

United Machinery Sales Co., Chicago, Ill.

MAGNESIUM ALLOY SHEETS

See Sheets, Magnesium Alloy

MAGNESIUM TUBING

See Tubing, Magnesium

MALLEABLE UNIONS

See Unions, Malleable

MANIFOLDS AND HEADERS, PREFABRICATED, FOR HEATING SYSTEMS

Acheson Mfg. Co., Rankin, Pa.
Copper Boiler & Heater Wks., Manitowoc, Wis.
Dunham Co., C. A., Chicago, Ill.
Grinnell Co., Inc., Providence, R. I.
Hi-Flow Products, Inc., Lindenhurst, N. Y.
Milwaukee Valve Co., Milwaukee, Wis.
Ohio Brass Co., Mansfield, O.
Thrush & Co., H. A., Peru, Ind.

MANIFOLDS, REFRIGERATION

Frick Co., Waynesboro, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Mueller Brass Co., Port Huron, Mich.
Reco Products Div., Recony Corp., New York, N. Y.
Sporlan Valve Co., St. Louis, Mo. (refrigerant distributors)
Superior Valve and Fittings Co., Pittsburgh, Pa.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Vilter Mfg. Co., Milwaukee, Wis.
York Corp., York, Pa.

MANOMETERS

American Meter Co., Inc., Philadelphia, Pa.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Bristol Co., The, Waterbury, Conn.
Builders-Providence Inc., Div. of Builders Iron Foundry, Providence, R. I.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Elgin-Refinite, Div. of Elgin Softener Corp., Elgin, Ill.
Fischer & Porter Co., Hatboro, Pa.
Hastings Instrument Co., Inc., Hampton, Va.
Hill & Co., E. Vernon, Lake Geneva, Wis.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
King Engineering Corp., Ann Arbor, Mich.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Norwalk Valve Co., South Norwalk, Conn.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
Wallace & Tiernan Co., Inc., Newark, N. J.
Will Corp., Rochester, N. Y.

MARKERS, PIPE, HOLE AND SADDLE

Contour Marker Corp., Compton, Calif.
Jewel Mfg. Co., St. Paul, Minn.

MECHANICAL DRIVE TURBINES

See Turbines, Mechanical Drive

MECHANICAL SPEED CHANGERS

See Changers, Speed, Mechanical

MECHANICAL TRAPS

See Traps, Steam, Mechanical

MERCURY SWITCHES

See Switches, Mercury

METAL HOSE

See Hose, Metal and Fittings

METAL, POROUS, FOR FILTRATION, SEPARATION, DIFFUSION AND FLOW CONTROL

Keystone Carbon Co., Inc., St. Marys, Pa.
Moraine Products Div., General Motors Corp., Dayton, O.
Wabash Mfg. Co., Chicago, Ill.

METALLIC BELLOWS

See Bellows, Thermostatic and Metallic

METALLIC PACKING

See Packing, Metallic

METERS, AIR VELOCITY, DIRECT READING

Air Devices, Inc., New York, N. Y.
Anemostat Corp. of America, New York, N. Y.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Hastings Instrument Co., Inc., Hampton, Va.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Taylor Instrument Companies, Rochester, N. Y.

METERS, BTU, FOR MEASURING FLOW AND TEMPERATURE AND CALIBRATED IN BTU OR THERMS

Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Hagan Corp., Pittsburgh, Pa.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.

METERS, CONDENSATION

American District Steam Co., Inc., North Tonawanda, N. Y.
Buffalo Meter Co., Buffalo, N. Y.
Central Station Steam Co., Detroit, Mich.
Neptune Meter Co., New York, N. Y.

METERS, FLOW, GAS OR AIR

American Meter Co., Inc., Philadelphia, Pa.
Bristol Co., The, Waterbury, Conn.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Hagan Corp., Pittsburgh, Pa.
Hastings Instrument Co., Inc., Hampton, Va.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
National Instrument Laboratories, Inc., Riverdale, Md.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Rockwell Mfg. Co., Meter & Valve Div., Pittsburgh, Pa.
Uehling Instrument Co., Paterson, N. J.

METERS, FLOW, REFRIGERANT

Bailey Meter Co., Cleveland, O.

Barton Instrument Corp., Los Angeles, Calif.
Bristol Co., The, Waterbury, Conn.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Moore Products Co., Philadelphia, Pa.
Neptune Meter Co., New York, N. Y.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Schutte & Koerting Co., Cornwells Heights, Bucks County, Pa.
Trimount Instrument Co., Chicago, Ill.
United States Gauge, Div. of American Machine and Metals, Inc., Sellersville, Pa.

METERS, FLOW, STEAM

American Meter Co., Inc., Philadelphia, Pa.
Bailey Meter Co., Cleveland, O.
Barton Instrument Corp., Los Angeles, Calif.
Bristol Co., The, Waterbury, Conn.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Mason-Neilan Regulator Co., Boston, Mass.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Instrument Div., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.

METERS, PROCESS LIQUID

American Meter Co., Inc., Philadelphia, Pa.
Bailey Meter Co., Cleveland, O.
Barton Instrument Corp., Los Angeles, Calif.
Bowser, Inc., Fort Wayne, Ind.
Bristol Co., The, Waterbury, Conn.
Buffalo Meter Co., Buffalo, N. Y.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Mason-Neilan Regulator Co., Boston, Mass.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia.
Moore Products Co., Philadelphia, Pa.
Neptune Meter Co., New York, N. Y.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Rockwell Mfg. Co., Meter and Valve Div., Pittsburgh, Pa.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Swartwout Co., The, Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.
Worthington-Gamon Meter Div., Worthington Corp., Newark, N. J.

METERS, VOLUME, AIR AND GAS

American Meter Co., Inc., Philadelphia, Pa.
Bristol Co., The, Waterbury, Conn.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Hagan Corp., Pittsburgh, Pa.
Hastings Instrument Co., Inc., Hampton, Va.
Hays Corp., Michigan City, Ind.
Meriam Instrument Co., The, Cleveland, O.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Rockwell Mfg. Co., Meter & Valve Div., Pittsburgh, Pa.
Roots-Connersville Blower Div., Connersville, Ind.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Selas Corp. of America, Philadephia, Pa.
Taylor Instrument Companies, Rochester, N. Y.
Uehling Instrument Co., Paterson, N. J.
Wallace & Tiernan Co., Inc., Newark, N. J.

METERS, WATER

American Moistening Co., Providence, R. I.
Bailey Meter Co., Cleveland, O.
Buffalo Meter Co., Buffalo, N. Y.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Hagan Corp., Pittsburgh, Pa.
Hersey Mfg. Co., South Boston, Mass.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
National Meter Co., Brooklyn, N. Y.
Neptune Meter Co., New York, N. Y.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Pfening Co., Fred D., Columbus, O. (batch measuring)
Republic Flow Meters Co., Chicago, Ill.
Rockwell Mfg. Co., Meter and Valve Div., Pittsburgh, Pa.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Union Water Meter Co., Worcester, Mass.
Worthington-Gamon Meter Div., Worthington Corp, Newark, N. J.

MIXING VALVES

See Valves, Mixing, Steam and Water

MODULATING VALVES

See Valves, Radiator, Steam and Hot Water Modulating

MOTOR BASES

See Bases and Pads, Vibration Isolating; Bases, Motor Tension Adjusting

MOTOR CONTROLLERS

See Controllers and Starters, Motor

MOTOR OPERATED VALVES

See Valves, Motor Operated

MOTOR STARTERS

See Controllers and Starters, Motor

MOTORS, COMPRESSED AIR POWERED

Chicago Pneumatic Tool Co., New York, N. Y.
Detroit Hoist & Machine Co., Detroit, Mich.
Gardner-Denver Co., Quincy, Ill.
Ingersoll-Rand Co., New York, N. Y.
Joy Mfg. Co., Pittsburgh, Pa.
Keller Tool Co., Grand Haven, Mich.
Leiman Bros., Inc., Newark, N. J.

MOTORS, ELECTRIC, FRACTIONAL HP

Abart Gear & Machine Co., Chicago, Ill.
Acro Mfg. Co., The, Columbus, O.
Alliance Mfg. Co., Alliance, O. (Shaded pole)
Baldor Electric Co., St. Louis, Mo.
Barber-Colman Co., Rockford, Ill.
Belgian Electric Sales Corp., New York, N. Y.
Bodine Electric Co., Chicago, Ill.
Brown-Brockmeyer Co., Inc., Dayton, O.
Burke Electric Co., Div. of Marathon Electric Mfg. Corp., Erie, Pa.
Century Electric Co., St. Louis, Mo.
Crise Mfg. Co., The, Columbus, O.
Dayton Electric Mfg. Co., Chicago, Ill.
Delco Products Div., General Motors Corp., Dayton, O.
Diehl Mfg. Co., Somerville, N. J.
Doerr Electric Corp., Cedarburg, Wis.
Eastern Air Devices, Inc., Brooklyn, N. Y.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Electric Motor Corp., Div. of Howard Industries, Inc., Racine, Wis.
Emerson Electric Mfg. Co., The, St. Louis, Mo.
Fasco Industries, Inc., Rochester, N. Y.
Fairbanks, Morse & Co., Chicago, Ill.
Franklin Electric Co., Inc., Bluffton, Ind.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hansen Mfg. Co., Inc., Princeton, Ind.
Hoover Co., The, Electric Motor Div., North Plainfield, N. J.
Howell Electric Motors Co., Howell, Mich.
Iron Fireman Mfg. Co., Cleveland, O.
Jack & Heintz, Inc., Cleveland, O.
Kasson Die & Motors Corp., New York, N. Y.
Kraus Co., Walter S., Woodside, L. I., N. Y.
Lamb Electric Co., Kent, O.
Leland Electric Co., The, Div. of American Machine & Foundry Co., Dayton, O.
Lima Electric Motor Co., The, Lima, O.
Marathon Electric Mfg. Corp., Wausau, Wis.
Marco Industries, Inc., Depew, N. Y.
Master Electric Co., Dayton, O.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moore Co., The, Marceline, Mo. (Slow speed fan motors)
Ohio Electric Mfg. Co., The, Maple Heights, O.
Peerless Electric Co., Warren, O.
Portable Electric Tools, Inc., Chicago, Ill.
Redmond Co., Inc., Owosso, Mich.
Reynolds Electric Co., River Grove, Ill.
Ripley Co., Inc., Middletown, Conn.
Robbins & Myers, Inc., Springfield, O.
Royal Mfg. Corp., Waterloo, Ind.
Reuland Electric Co., Alhambra, Calif.
Small Motors Inc., Chicago, Ill.
Smith Corp., A. O., Eastern Motor Div., Dayton, O.
Smith Corp., A. O., Milwaukee, Wis.
Torq Electric Mfg. Corp., Bedford, O.
U. S. Electrical Motors, Inc., Los Angeles, Calif.
Wagner Electric Corp., St. Louis, Mo.
Westinghouse Electric Corp., Pittsburgh, Pa.

MOTORS, ELECTRIC, 1 HP AND OVER

Abart Gear & Machine Co., Chicago, Ill.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Allis Co., Louis, The, Milwaukee, Wis.

Armor Electric Co., Erie, Pa.
Baldor Electric Co., St. Louis, Mo.
Belgian Electric Sales Corp., New York, N. Y.
Brook Motor Corp., Chicago, Ill.
Brown-Brockmeyer Co., Inc., Dayton, O.
Burke Electric Co., Div. of Marathon Electric Mfg. Corp., Erie, Pa.
Byron Jackson Co., Los Angeles, Calif. (submersible)
Century Electric Co., St. Louis, Mo.
Continental Electric Co., Inc., Newark, N. J.
Dayton Electric Mfg. Co., Chicago, Ill.
Delco Products Div., General Motors Corp., Dayton, O.
Diehl Mfg. Co., Somerville, N. J.
Doerr Electric Corp., Cedarburg, Wis.
Electric Machinery Mfg. Co., Minneapolis, Minn.
Electro Dynamic Div. of General Dynamics Corp., Bayonne, N. J.
Elliott Co., Crocker-Wheeler Div., Ampere, N. J.
Emerson Electric Mfg. Co., The, St. Louis, Mo.
Fairbanks, Morse & Co., Chicago, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hertner Electric Co., The, Cleveland, O.
Hoover Co., The, Electric Motor Div., North Plainfield, N. J.
Howell Electric Motors Co., Howell, Mich.
Ideal Electric & Mfg. Co., Mansfield, O.
Imperial Electric Co., Akron, O.
Kraus Co., Walter S., Woodside, L. I., N. Y.
Leland Electric Co., The, Div. of American Machine & Foundry Co., Dayton, O.
Lima Electric Motor Co., The, Lima, O.
Marathon Electric Mfg. Corp., Wausau, Wis.
Marble-Card Electric Co., Gladstone, Mich.
Master Electric Co., Dayton, O.
Moore Co., The, Marceline, Mo. (Slow speed fan motors)
Peerless Electric Co., Warren, O.
Reliance Electric & Engineering Co., Cleveland, O.
Reuland Electric Co., Alhambra, Calif.
Robbins & Myers, Inc., Springfield, O.
Smith Corp., A. O., Eastern Motor Div., Dayton, O.
Smith Corp., A. O., Milwaukee, Wis.
Star-Kimble Motor Div., Miehle Prntg. Press & Mfg. Co., Bloomfield, N. J.
Sterling Electric Motors, Inc., Los Angeles, Calif.
U. S. Electrical Motors, Inc., Los Angeles, Calif.
Wagner Electric Corp., St. Louis, Mo.
Westinghouse Electric Corp., Pittsburgh, Pa.

MOUNTINGS, VIBRATION

See Bases and Pads, Vibration Isolating

MUFFLERS, HOT GAS, FOR REFRIGERANT LINES

Armstrong Co., Richard M., West Chester, Pa.
Industrial Acoustics Co., New York, N. Y.

MUSHROOM VENTILATORS

See Ventilators, Mushroom

NEUTRALIZERS, ACID

See Dehydrant and Acid Neutralizer

NEUTRALIZERS, ODOR

See Adsorbers, Odor

NICKEL AND NICKEL ALLOY PIPE AND FITTINGS

See Tubing, Nickel and Alloy; Fittings, Pipe, Nickel and Nickel Alloy; Pipe, Nickel and Nickel Alloy

NICKEL AND NICKEL ALLOY SHEETS

See Sheets, Nickel and Nickel Alloy

NIPPLES, PIPE, BRASS AND COPPER

Acheson Mfg. Co., Rankin, Pa.
Allen Mfg. Co., W. D., Chicago, Ill.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Nipple Mfg. Co., Cicero, Ill.
Columbus Mfg. & Supply Co., Columbus, O.
Couplings Co., Chicago, Ill.
Crane Co., Chicago, Ill.
G & H Mfg. Co., Philadelphia, Pa.
Gilbert Brass Foundry Co., St. Louis, Mo.
Grinnell Co., Inc., Providence, R. I.
Imperial Brass Mfg. Co., Chicago, Ill.
Keeney Mfg. Co., Newington, Conn.
Mueller Brass Co., Port Huron, Mich.
Pacific Fittings Div., General Metals Corp., Hollydale, Calif.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Pittsburgh Nipple Wks., Inc., Pittsburgh, Pa.
Sawhill Mfg. Co., Sharon, Pa.
Star Tubular Products Co., Chicago, Ill.
Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Ware Coupling & Nipple Co., Ware, Mass.
Weatherhead Co., Cleveland, O.

NIPPLES, PIPE, FLEXIBLE

Davis Engineering Corp., Elizabeth, N. J.
Johnson Metal Hose, Inc., Waterbury, Conn.
Lindy Heaters, Inc., New York, N. Y.
Techniflex Corp., Port Jervis, N. Y.

NIPPLES, PIPE, IRON AND STEEL

Allen Mfg. Co., W. D., Chicago, Ill.
Byers Co., A. M., Pittsburgh, Pa. (Wrought iron)
Chicago Nipple Mfg. Co., Cicero, Ill.
Clow & Sons, James B., Chicago, Ill.
Columbus Mfg. & Supply Co., Columbus, O.
Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
Grabler Mfg. Co., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis. (Stainless steel and alloy only)
Illinois Malleable Iron Co., Chicago, Ill.
Larkin Packer Co., Inc., St. Louis, Mo.
Pacific Fittings Div., General Metals Corp., Hollydale, Calif.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Pittsburgh Nipple Wks., Inc., Pittsburgh, Pa.
Sawhill Mfg. Co., Sharon, Pa.
Star Tubular Products Co., Chicago, Ill.
Union Malleable Mfg. Co., Ashland, O.
Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Ware Coupling & Nipple Co., Ware, Mass.
Wheeling Machine Products Co., Wheeling, W. Va.

NIPPLES, PIPE, NICKEL AND NICKEL ALLOY

Camco Products, Inc., North Haven, Conn.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Flori Pipe Co., The, St. Louis, Mo.
Tri-Clover Machine Co., Kenosha, Wis.

NIPPLES, RADIATOR, SLIP AND SCREW

Plumb Mfg. Co., Utica, N. Y.

NOISE ELIMINATION FOR COOLING TOWERS

Industrial Acoustics Co., New York, N. Y.
Industrial Sound Control, Inc., Hartford, Conn.

NOISE ELIMINATORS

See Bases and Pads, Vibration Isolating; Hose, Metal and Fittings; Insulation, Sound Deadening

NOZZLES, ATOMIZING

American Moistening Co., Providence, R. I.
Bahnson Co., Winston-Salem, N. C.
Benjamin Air Rifle Co., St. Louis, Mo.
Bete Fog Nozzle Inc., Greenfield, Mass.
Binks Mfg. Co., Chicago, Ill.
Boston Machine Works Co., Lynn, Mass.
Delavan Mfg. Co., West Des Moines, Ia.
Eddington Metal Specialty Co., Eddington, Pa.
Electric Sprayit Co., The, Sheboygan, Wis.
Engineer Co., New York, N. Y.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Parks-Cramer Co., Fitchburg, Mass.
Ross Sprinkler Co., Pasadena, Calif.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Spray Engineering Co., Somerville, Mass.
Spraying Systems Co., Bellwood, Ill.
Supreme Electric Products Corp., Rochester, N. Y.
Water Cooling Corp., New York, N. Y.

NOZZLES, FLOODING

Binks Mfg. Co., Chicago, Ill.
Eddington Metal Specialty Co., Eddington, Pa.
Spraying Systems Co., Bellwood, Ill.
Water Cooling Corp., New York, N. Y.

NOZZLES, FLOW MEASURING

Able Metal Spinning & Stamping Co., New York, N. Y.
Bailey Meter Co., Cleveland, O.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Delavan Mfg. Co., West Des Moines, Ia.
Foster Engineering Co., Union, N. J.
Foxboro Mfg. Co., Foxboro, Mass.
Hagan Corp., Pittsburgh, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.

NOZZLES, OIL BURNER

Century Engineering Corp., Cedar Rapids, Ia.
Engineer Co., New York, N. Y.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Steinen Mfg. Co., Wm., Newark, N. J.

NOZZLES, SPARGER, FOR TANK HEATING

Heil Process Equipment Corp., Cleveland, O.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.

NOZZLES, SPRAY

American Cooling Tower Co., Kansas City, Mo.

American Moistening Co., Providence, R. I.
April Showers Co., Inc., Washington, D. C.
Bahnson Co., Winston-Salem, N. C.
Balloffet Nozzle Co., Inc., Guttenberg, N. J.
Bayley Blower Co., Milwaukee, Wis.
Benjamin Air Rifle Co., St. Louis, Mo.
Bete Fog Nozzle Inc., Greenfield, Mass.
Binks Mfg. Co., Chicago, Ill.
Black Mfg. Co., The, Harrison, N. J.
Blower Application Co., Milwaukee, Wis.
Buensod-Stacey, Inc., New York, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Chain Belt Co., Milwaukee, Wis.
Clarage Fan Co., Kalamazoo, Mich.
Delavan Mfg. Co., West Des Moines, Ia.
Duriron Co., Inc., Dayton, O.
Eddington Metal Specialty Co., Eddington, Pa.
Electric Sprayit Co., The, Sheboygan, Wis.
Fluor Corp., Ltd., The, Los Angeles, Calif.
Grinnell Co., Inc., Providence, R. I.
Harry Cooling Towers, Inc., New York, N. Y.
Link-Belt Co., Chicago, Ill.
Maid-O'-Mist, Inc., Chicago, Ill.
Marley Co., Inc., The, Kansas City, Mo.
Monarch Mfg. Wks., Inc., Philadelphia, Pa.
Parks-Cramer Co., Fitchburg, Mass.
Phillips Cooling Tower Co., Inc., Brooklyn, N. Y.
Plummer Spray Equipment Co., Napoleon, O.
Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Rega Mfg. Co., Rochester, N. Y.
Rockwood Sprinkler Co., Worcester, Mass.
Ross Sprinkler Co., Pasadena, Calif.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Skinner Irrigation Co., Troy, O.
Spray Engineering Co., Somerville, Mass.
Spraying Systems Co., Bellwood, Ill.
Steinen Mfg. Co., Wm., Newark, N. J.
Supreme Electric Products Corp., Rochester, N. Y.
Water Cooling Corp., New York, N. Y.
Water Cooling Equipment Co., St. Louis, Mo.
Yarnall-Waring Co., Philadelphia, Pa.

NUTS, LOCK

Chase Brass & Copper Co., Waterbury, Conn.
Crane Co., Chicago, Ill.
Elastic Stop Nut Corp. of America, Union, N. J.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Grinnell Co., Inc., Providence, R. I.
Grip Nut Co., Chicago, Ill.
Industrial Screw Co., Chicago, Ill.
Kwikon Co., Chicago, Ill.
Lamson & Sessions Co., Cleveland, O.
Locknut Corp. of America, Chicago, Ill.
MacLean-Fogg Lock Nut Co., Chicago, Ill.
Palnut Co., Irvington, N. J.
Republic Steel Corp., Bolt & Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
SKF Industries, Inc., Philadelphia, Pa.
Shakeproof Div., Illinois Tool Wks., Elgin, Ill. (Lock washers)
Standard Pressed Steel Co., Jenkintown, Pa.
Stockham Valves & Fittings, Birmingham, Ala.
Swallow Airplane Co., Wichita, Kan.
Tinnerman Products, Inc., Cleveland, O.
Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.

OBSERVATION BOILER PORTS

See Ports, Observation, Boiler

ODOR ADSORBERS

See Filters, Air; Adsorbers, Odor

ODOR NEUTRALIZERS

See Adsorbers, Odor; Compounds, Air Freshening

OIL BURNERS

See Burners, Oil

OIL COOLERS

See Coolers, Oil

OIL, CUTTING, PIPE

Blue Seal Chemical Co., Roselle Park, N. J.
Capewell Mfg. Co., Hartford, Conn.
Hercules Chemical Co., Inc., New York, N. Y.
Ridge Tool Co., Elyria, O.
Shell Oil Co., Lubricants Dept., New York, N. Y.
Suflo, Inc., Elizabeth, N. J.
X Laboratories, Inc., New York, N. Y.

OIL, HEAT TRANSFER

Shell Oil Co., Lubricants Dept., New York, N. Y.
Socony-Vacuum Oil Co., Inc., New York, N. Y.

OIL, REFRIGERATION

Ansul Chemical Co., Refrigeration Div., Marinette, Wis.
Frick Co., Waynesboro, Pa.
Gulf Oil Corp., Pittsburgh, Pa.
Houghton & Co., E. F., Philadelphia, Pa.
Illinois Oil Products, Inc., Rock Island, Ill.
Shell Oil Co., Lubricants Dept., New York, N. Y.
Socony-Vacuum Oil Co., Inc., New York, N. Y.
Standard Oil Co. of California, Los Angeles, Calif.
Standard Oil Co. of Indiana, Chicago, Ill.
Sun Oil Co., Philadelphia, Pa.
Texas Co., The, New York, N. Y.
York Corp., York, Pa.

OIL SEPARATORS

See Separators, Steam and Oil

OPERATORS, DAMPER, DUCT

Acro Mfg. Co., The, Columbus, O.
Arens Controls, Inc., Evanston, Ill.
Au-Temp-Co Corp., New York, N. Y.
Automatic Devices Co., Inc., Western Springs, Ill.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Conoflow Corp., Philadelphia, Pa.
Consolidated Metal Products Corp., Albany, N. Y.
Foxboro Co., Foxboro, Mass.
General Controls Co., Glendale, Calif., and Skokie, Ill.
Hagan Corp., Pittsburgh, Pa.
Hart & Cooley Mfg. Co., Holland, Mich.
Johnson Service Co., Milwaukee, Wis.
Mason-Neilan Regulator Co., Boston, Mass.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Shallcross Controls, Inc., Milwaukee, Wis.
Soreng Products Corp., Schiller Park, Ill.
Taylor Instrument Companies, Rochester, N. Y.
Wa-Trol, Houston, Tex.
Young Regulator Co., Cleveland, O.

OPERATORS, VALVE

Au-Temp-Co Corp., New York, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Babbitt Steam Specialty Co., New Bedford, Mass.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
De Zurik Shower Co., Sartell, Minn.
Foxboro Co., Foxboro, Mass.
General Controls Co., Glendale, Calif., and Skokie, Ill.
Grove Regulator Co., Oakland, Calif.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
Johnson Service Co., Milwaukee, Wis.
Kieley & Mueller, Inc., Middletown, N. Y.
Ledeen Mfg. Co., Los Angeles, Calif.
Mason-Neilan Regulator Co., Boston, Mass.
McDonnell & Miller, Inc., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Okadee Co., Chicago, Ill.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Shallcross Controls, Inc., Milwaukee, Wis.
Techniflex Corp., Port Jervis, N. Y.
Taylor Instrument Companies, Rochester, N. Y.

ORIFICE FLANGES

See Flanges, Orifice

ORIFICE UNIONS

See Unions, Orifice

ORIFICES, FLOW MEASURING

Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Hagan Corp., Pittsburgh, Pa.
Madden Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Penberthy Injector Co., Div. of Buffalo Eclipse Corp., Detroit, Mich
Penn Industrial Instrument Corp., Philadelphia, Pa.
Trimount Instrument Co., Chicago, Ill.

ORIFICES, RADIATOR

Au-Temp-Co Corp., New York, N. Y.

Barnes & Jones, Inc., Boston, Mass.
Cashin Co., W. D., Boston, Mass.
Grinnell Co., Inc., Providence, R. I.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Tallmadge, Webster, Systems, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Thrush & Co., H. A., Peru, Ind.
Webster & Co., Warren, Camden, N. J.

OVERFIRE AIR JETS

See Jets, Overfire Air, for Smoke Abatement

OVER-PRESSURE UNLOADERS, FOR REFRIGERANTS

Black-Sivalls & Bryson, Inc., Kansas City, Mo.

OXYGEN PIPING AND REGULATING SYSTEMS

Linde Air Products Co., A Div. of Union Carbide & Carbon Corp., New York, N. Y.
Oxygen Equipment & Service Co., Chicago, Ill.

OZONE APPARATUS

General Ozone Corp., Chicago, Ill.
Montgomery Bros., San Francisco, Calif.
Norwood Associated Engineers Inc., Springfield, Mass.
Ozone Air Co., Grand Rapids, Mich.
United States Ozone Co. of America, Scottdale, Pa.
Welsbach Corp., The, Ozone Processes Div., Philadelphia, Pa.

PACKAGED HEAT PUMP UNITS

See Unit, Air Conditioning, Reverse Refrigeration Cycle

PACKAGED STEAM GENERATORS

See Boilers, Packaged Units, Heating and Process

PACKING, ASBESTOS

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Allpax Co., Inc., Mamaroneck, N. Y.
Anchor Packing Co., Philadelphia, Pa.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Chesterton Co., A. W., Everett, Mass.
Chicago Gasket Co., Chicago, Ill.
Chicago Specialty Mfg. Co., Chicago, Ill.
Crane Packing Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y.
Durabla Mfg. Co., New York, N. Y.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Felt Products Mfg. Co., Chicago, Ill.
Flexrock Co., Philadelphia, Pa.
Garlock Packing Co., Palmyra, N. Y.
Gatke Corp., Chicago, Ill.
Goodyear Tire & Rubber Co., Akron, O.
Grant Wilson Inc., Chicago, Ill.
Greene, Tweed & Co., North Wales, Pa.
Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Linear Incorporated, Philadelphia, Pa.
Metallo Gasket Co., New Brunswick, N. J.
New York Belting & Packing Co., Passaic, N. J.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Q-P Mfg. Co., Needham Heights, Mass.
Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Philadelphia, Pa
Raybestos-Manhattan, Inc., Passaic, N. J.
Sall Mountain Co., Hamilton, O.
Strahman Valves, Inc., New York, N. Y. (Sheet and rod)
Union Asbestos & Rubber Co., Chicago, Ill.
United States Rubber Co., New York, N. Y.
Zimmerman Packing Co., Cincinnati, O.

PACKING, FIBER

American Felt Co., Glenville, Conn.
Anchor Packing Co., Philadelphia, Pa.
Armstrong Cork Co., Lancaster, Pa.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Chesterton Co., A. W., Everett, Mass.
Chicago Gasket Co., Chicago, Ill.
Crane Packing Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y.
Durabla Mfg. Co., New York, N. Y.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Endura Mfg. Corp., Quakertown, Pa.
Flexrock Co., Philadelphia, Pa.
Garlock Packing Co., Palmyra, N. Y.
Greene, Tweed & Co., North Wales, Pa.
Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y.
Linear Incorporated, Philadelphia, Pa.
Metallo Gasket Co., New Brunswick, N. J.
New York Belting & Packing Co., Passaic, N. J.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Products Research Co., Los Angeles, Calif.
Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Philadelphia, Pa
Raybestos-Manhattan, Inc., Passaic, N. J.
Union Asbestos & Rubber Co., Chicago, Ill.
United States Rubber Co., New York, N. Y.
Zimmerman Packing Co., Cincinnati, O.

PACKING, LEATHER

Alexander Bros., Philadelphia, Pa.
Anchor Packing Co., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Chicago Belting Co., Chicago, Ill.
Chicago Gasket Co., Chicago, Ill.
Davis & Co., Wayne, Westboro, Mass.
Excelsior Leather Washer Mfg. Co., Rockford, Ill.
Garlock Packing Co., Palmyra, N. Y.
Graton & Knight Co., Worcester, Mass.
Houghton & Co., E. F., Philadelphia, Pa.
Q-P Mfg. Co., Needham Heights, Mass.
Rhoads & Sons, J. E., Philadelphia, Pa.
Schieren Co., Chas. A., New York, N. Y.
Williams & Son, I. B., Dover, N. H.
Zimmerman Packing Co., Cincinnati, O.

PACKING, METALLIC

Abbott & Biddle Co., Philadelphia, Pa.
Allpax Co., Inc., Mamaroneck, N. Y.
Anchor Packing Co., Philadelphia, Pa.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Chesterton Co., A. W., Everett, Mass.
Chicago Gasket Co., Chicago, Ill.
Conneaut Plastic Metallic Packing Co., Conneaut, O.
Crane Packing Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y.
Felt Products Mfg. Co., Chicago, Ill.
Flexrock Co., Philadelphia, Pa.
France Packing Co., Philadelphia, Pa.
Garlock Packing Co., Palmyra, N. Y.
Greene, Tweed & Co., North Wales, Pa.
Johns-Manville, New York, N. Y.
Linear Incorporated, Philadelphia, Pa.
National Engineering Products Inc., Washington, D. C.
New York Belting & Packing Co., Passaic, N. J.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Q-P Mfg. Co., Needham Heights, Mass.
Strahman Valves, Inc., New York, N. Y. (sheet and rod)
Union Asbestos & Rubber Co., Chicago, Ill.
United States Rubber Co., New York, N. Y.
Zimmerman Packing Co., Cincinnati, O.

PACKING, RUBBER AND SYNTHETIC

American Felt Co., Glenville, Conn.
Anchor Packing Co., Philadelphia, Pa.
Armstrong Cork Co., Lancaster, Pa.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Chesterton Co., A. W., Everett, Mass.
Chicago Belting Co., Chicago, Ill.
Chicago Gasket Co., Chicago, Ill.
Chicago Specialty Mfg. Co., Chicago, Ill.
Continental Rubber Wks., Erie, Pa.
Crane Packing Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y.
Dow Corning Corp., Midland, Mich.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Felt Products Mfg. Co., Chicago, Ill.
Firestone Industrial Products Co., Akron, O.
Flexrock Co., Philadelphia, Pa.
Garlock Packing Co., Palmyra, N. Y.
Gates Rubber Co., Denver, Colo.
General Electric Co., Chemical Div., Pittsfield, Mass.
Gil-Lair Products, Inc., Pasadena, Calif.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Graton & Knight Co., Worcester, Mass.
Greene, Tweed & Co., North Wales, Pa.
Hamilton Rubber Mfg. Corp., Trenton, N. J.
Houghton & Co., E. F., Philadelphia, Pa.
Johns-Manville, New York, N. Y.
Linear Incorporated, Philadelphia, Pa.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
New York Belting & Packing Co., Passaic, N. J.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Parker Appliance Co., The, Cleveland, O.
Products Research Co., Los Angeles, Calif.
Q-P Mfg. Co., Needham Heights, Mass.
Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Saran Lined Pipe Co., Ferndale, Mich.
Thermoid Co., Trenton, N. J.
United States Gasket Co., Camden, N. J.
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.
Zimmerman Packing Co., Cincinnati, O.

PAINT, HIGH TEMPERATURE, FOR HOT SURFACES

American-Marietta Co., Chicago, Ill.
Baer Bros., New York, N. Y.
Babbitt Chemical Specialties Co., New Bedford, Mass.
Barrett Div., Allied Chemical & Dye Corp., New York, N. Y.
Chemical Solvent Co., Birmingham, Ala.
Claronex Products, Inc., Brooklyn, N. Y.
Continental Products Co., Euclid, O.
Debevoise Co., The, Brooklyn, N. Y.
Dixon Crucible Co., Joseph, Jersey City, N. J.
Flexrock Co., Philadelphia, Pa.
Foster Co., Benjamin, Philadelphia, Pa.
Hetzel Roofing Products Co., Newark, N. J.
Illinois Bronze Powder Co., Chicago, Ill.
Koppers Company, Inc., Pittsburgh, Pa.
Midland Paint & Varnish Co., Cleveland, O.
National Lead Co., New York, N. Y.
Nebel Mfg. Co., Cleveland, O.
O'Brien Corp., The, South Bend, Ind.
Steelcote Mfg. Co., St. Louis, Mo.
Thompson and Co., Oakmont, Pa.
Tropical Paint & Oil Co., Cleveland, O.
Truscon Laboratories, Detroit, Mich.
United Chromium, Inc., New York, N. Y.
Warren Refining & Chemical Co., The, Cleveland, O.
Wilbur & Williams Co., Brighton, Mass.

PANEL BOARDS

See Boards, Panel and Control

PANEL HEATING AND COOLING

See Coils and Panels, Radiant Heating and Cooling; Conductors and Panels, Electrical, for Radiant Heating

PANELS, PERFORATED, FOR AIR DIFFUSION

Luminous Ceilings, Inc., Chicago, Ill.
Multi-Vent Div., Pyle-National Co., The, Chicago, Ill.
Simplex Ceiling Corp., New York, N. Y.

PARTS FOR HEATING AND AIR CONDITIONING EQUIPMENT

Ackermann Mfg. Co., Wheeling, W. Va.
Adams Co., The, Dubuque, Iowa
Air & Refrigeration Corp., New York, N. Y. (insulated panels)
Atlas Mfg. Co., St. Paul, Minn. (boiler jackets)
Berger Mfg. Div., Republic Steel Corp., Canton, O. (cabinets, housings, canopies)
Camloc Fastener Corp., New York, N. Y. (Fasteners for access panels and sheet metal)
Carey Mfg. Co., Philip, Lockland, Cincinnati, O. (Insulating panel for housing and duct construction)
Cincinnati Metalcrafts Inc., Cincinnati, O. (sheet metal fabricating)
Commercial Shearing & Stamping Co., Youngstown, O.
Detroit Stamping Co., Detroit, Mich.
Dover Metal Products Co., The, Canal Fulton, O.
Duro-Dyne Corp., Hempstead, L. I., N. Y. (hardware and parts used in fabricating dampers and turning vanes)
Dzus Fastener Co., Inc., Babylon, N. Y. (quick-acting quarter-turn fasteners for access doors, inspection panels, etc.)
Eaton Mfg. Co., Detroit, Mich. (gray iron castings for air conditioning equipment)
Falstrom Co., Passaic, N. J. (Air conditioning cabinets, steel control panels)
Lindsay Structure, Inc., Skokie, Ill. (Cabinet construction for air conditioning and warm air heating equipment)
Metalcraft Inc., Mason City, Ia. (nameplates for equipment)
Mueller Brass Co., Port Huron, Mich. (Specially fabricated copper tubing, machine formed tubes)
National Lock Co., Inc., Rockford, Ill. (hinges, handles, latches, catches, supports, etc.)
Phoenix Products Co., Milwaukee, Wis., (metal spinnings for fan housings, diffusers, etc.)
Pittsfield Products, Inc., Ann Arbor, Mich. (perforated metal parts)
South Chester Co., Southco Div., Lester, Pa. (blind rivets, panel fasteners, adjustable pawl fasteners, door retaining springs)
Speakman Co., Wilmington, Del. (machined parts)
Rigidized Metals Corp., Buffalo, N. Y.

PARTS, REFRIGERATING COMPRESSOR

Delavan Mfg. Co., West Des Moines, Ia.
Refrigeration Devices Co., Nutley, N. J. (oiler for refrigeration compressors)

PENETRANT, DYE, FOR NON-DESTRUCTIVE TESTING OF METAL

Turco Products, Inc., Los Angeles, Calif.

pH INDICATORS

See Indicators, pH

PILLOW BLOCK BEARINGS

See Bearings, Pillow Block

PILOT LIGHTS

See Lights, Pilot and Signal

PIPE, ALUMINUM

Aluminum Co. of America, Pittsburgh, Pa.
Colonial Alloy Co., Metals Div., Philadelphia, Pa.
Kaiser Aluminum & Chemical Corp., Oakland, Calif.
Revere Copper & Brass, Inc., New York, N. Y.
Reynolds Metals Co., Louisville, Ky.
Viking Copper Tube Co., Cleveland, O.

PIPE, ASBESTOS FIBER AND CEMENT

Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.

PIPE BENDERS

See Benders, Pipe

PIPE BIT SETS

See sets, Pipe Bit

PIPE, BRASS AND COPPER

American Brass Co., Waterbury, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Colonial Alloys Co., Metals Div., Philadelphia, Pa.
Hussey & Co., C. G., Div. Copper Range Co., Pittsburgh, Pa.
Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
Mueller Brass Co., Port Huron, Mich.
Phelps Dodge Copper Products Corp., British American Tube Div., New York, N. Y.
Reading Tube Corp., Long Island City, N. Y.
Revere Copper and Brass, Incorporated, New York, N. Y.
Viking Copper Tube Co., Cleveland, O.
Wolverine Tube Div., Calumet and Hecla, Inc., Detroit, Mich.

PIPE, CAST IRON, PRESSURE, BELL AND SPIGOT

Alabama Pipe Co., Anniston, Ala.
American Cast Iron Pipe Co., Birmingham, Ala.
Central Foundry Co., Newark, N. J.
Clow & Sons, James B., Chicago, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
Inner-Tite Div. of Yara Engineering Corp., Elizabeth, N. J.
Lynchburg Foundry Co., Lynchburg, Va.
McWane Cast Iron Pipe Co., Birmingham, Ala.
United States Pipe & Foundry Co., Birmingham, Ala.
Warren Foundry & Pipe Corp., New York, N. Y.

PIPE, CAST IRON, PRESSURE, FLANGED

Alabama Pipe Co., Anniston, Ala.
American Cast Iron Pipe Co., Birmingham, Ala.
Clow & Sons, James B., Chicago, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
Inner-Tite Div. of Yara Engineering Corp., Elizabeth, N. J.
Lynchburg Foundry Co., Lynchburg, Va.
McWane Cast Iron Pipe Co., Birmingham, Ala.
United States Pipe & Foundry Co., Birmingham, Ala.
Warren Foundry & Pipe Corp., New York, N. Y.

PIPE, CAST IRON, THREADED

American Cast Iron Pipe Co., Birmingham, Ala.
Clow & Sons, James B., Chicago, Ill.
McWane Cast Iron Pipe Co., Birmingham, Ala.
Somerville Iron Wks., Somerville, N. J.
United States Pipe & Foundry Co., Birmingham, Ala.
Warren Foundry & Pipe Corp., New York, N. Y.

PIPE CLEANING COMPOUNDS

See Compounds, Cleaning, Pipe Coil and Condenser

PIPE COILS

See Coils, Pipe

PIPE COUPLINGS

See Couplings, Pipe

PIPE COVERING, ADHESIVES

See Adhesives, for Pipe Covering

PIPE CUTTERS

See Cutters

PIPE CUTTING MACHINES

See Machines, Pipe Cutting and Threading; Cleaners, Pipe Line, Electrically Driven; Rams, Water, for Cleaning Out Pipe Lines

PIPE EXTRACTORS

See Extractors, Pipe

PIPE, FIBER

Brown Co., Boston, Mass.
Manufacturers Corp., Mansfield, O.
Orangeburg Mfg. Co., Orangeburg, N. Y.
Richland Co., Mansfield, O.

PIPE AND FITTINGS, GAS VENT AND FLUE

Adelta Mfg. Co., Inc., Philadelphia, Pa.
Char-Gale Mfg. Co., Minneapolis, Minn.
Condensation Engineering Corp., Chicago, Ill.
Corbman Bros., Inc., Philadelphia, Pa.
Enderle, Inc., Ltd., Frank X., Los Angeles, Calif.
Excelsior Steel Furnace Co., The, Chicago, Ill.
Johns-Manville, New York, N. Y.
Van-Packer Corp., Chicago, Ill.
Wallace Co., William, Metalbestos Div., Belmont, Calif.

PIPE FITTINGS

See Fittings, Pipe

PIPE, GLASS

Corning Glass Wks., Corning, N. Y.
Fischer & Porter Co., Hatboro, Pa.

PIPE HANGERS

See Hangers and Supports, Pipe

PIPE, HARD RUBBER

American Hard Rubber Co., New York, N. Y.
Goodrich Co., B. F., Akron, O.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Raybestos-Manhattan, Inc., Passaic, N. J.
Stokes Molded Products, Inc., Trenton, N. J.
United States Rubber Co., New York, N. Y.
Vanton Pump & Equipment Corp., New York, N. Y.

PIPE INSULATION ADHESIVES

See Adhesives, for Pipe Covering

PIPE, JACKETED

Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Flori Pipe Co., The, St. Louis, Mo.
Fluid Systems, Inc., New Haven, Conn.
Kaiser Co., E. B., Glenview, Ill.
Midwest Piping Co., Inc., St. Louis, Mo.
Nooter Corp., St. Louis, Mo.
Parks-Cramer Co., Fitchburg, Mass.
Pittsburgh Pipe Coil & Bending Co., Etna, Pa.
Red Jacket, Inc., Pittsburgh, Pa.
Ric-wiL Co., The, Barberton, O.
Roessing Mfg. Co., Pittsburgh, Pa.
Shaw-Kendall Engineering Co., Toledo, O.

PIPE JOINT COMPOUNDS

See Cement and Compounds, Pipe Joint

PIPE LOCATORS

See Locators, Pipe, Underground

PIPE, LINED

American Brass Co., Waterbury, Conn. (Tin)
American Cast Iron Pipe Co., Birmingham, Ala. (Cement)
American Hard Rubber Co., New York, N. Y. (Rubber)
Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Bart Mfg. Corp., Belleville, N. J.
Cement Lined Pipe Co., Lynn, Mass. (Cement)
Division Lead Co., Summit, Ill.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Gates Engineering Co., Wilmington, Del.
Goodrich Co., B. F., Akron, O. (Rubber-lined)
Heil Process Equipment Corp., Cleveland, O.
Heresite & Chemical Co., Manitowoc, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa. (Cement)
Kaiser Co., E. B., Glenview, Ill.
Knight, Maurice A., Akron, O.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead and tin lined)
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Michigan Pipe Co., Bay City, Mich. (Wood, saran rubber)
National Lead Co., New York, N. Y. (Lead)
Nooter Corp., St. Louis, Mo.
Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber)
Resisto Pipe & Valve Co., East Cambridge, Mass. (Lead)
Saran Lined Pipe Co., Ferndale, Mich.
United States Rubber Co., New York, N. Y. (Rubber)
United States Stoneware Co., New York, N. Y.
Warren Foundry & Pipe Corp., New York, N. Y. (Cement)
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE, NICKEL AND NICKEL ALLOY

Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Biggs Boiler Works Co., The, E. Akron, O.
Chase Brass & Copper Co., Waterbury, Conn.
Electric Steel Foundry Co., Portland, Ore.
Globe Steel Tubes Co., Milwaukee, Wis.
International Nickel Co., Inc., The, New York, N. Y.
Revere Copper and Brass, Incorporated, New York, N. Y.
Tri-Clover Machine Co., Kenosha, Wis.

PIPE, PLASTIC

Acadia Synthetic Products, Div., Western Felt Works, Chicago, Ill.
Alpha Plastics, Inc., W. Orange, N. J.
American Agile Corp., Cleveland, O.
American Hard Rubber Co., New York, N. Y.
Aqua-Therm, Inc., Dayton, O.
Carlon Products Corp., Cleveland, O.
Commercial Plastics Co., Chicago, Ill.
Continental-Diamond Fibre Co., Newark, Del.
Fibercast Corp., Tulsa, Okla.
Flexrock Co., Philadelphia, Pa.
General Ceramics & Steatite Corp., Keasbey, N. J.
Hamilton Rubber Mfg. Corp., Trenton, N. J.
Hartwell & Son, Inc., H. N., Boston, Mass.
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, O.
Irvington Varnish & Insulator Div. of Minnesota Mining & Mfg. Co., Irvington, N. J.
Knight, Maurice A., Akron, O.
Manufacturers Corp., Mansfield, O.
Michigan Plastic Pipe Co., Detroit, Mich.
Mills Corp., Elmer E., Chicago, Ill.
New York Belting & Packing Co., Passaic, N. J.
North Penn Co., New York, N. Y.
Panelyte Div., St. Regis Paper Co., New York, N. Y.
Plastex Pipe and Extrusion Co., The, Columbus, Ohio
Republic Steel Corp., Cleveland, O.
Richland Co., Mansfield, O.
Saran Lined Pipe Co., Ferndale, Mich.
Skyline Industries, Titusville, Pa.
Triangle Conduit & Cable Co., Inc., New Brunswick, N. J.
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.
Van Dorn Iron Wks., Cleveland, O.
Vanton Pump & Equipment Corp., New York, N. Y.
Yardley Plastics Co., Columbus, O.

PIPE PLUGS

See Plugs, Pipe

PIPE, PRE-INSULATED

American Insulated Pipe Co., New York, N. Y.
Durant Insulated Pipe Co., Palo Alto, Calif.
Durant International Corp., Williamstown, N. J.
Flexible Tubing Corp., Guilford, Conn.
Kaiser Co., E. B., Glenview, Ill.
Ric-wiL Co., The, Barberton, O.
Universal Sewer Pipe Co., Cleveland, Ohio

PIPE REAMERS

See Reamers, Pipe

PIPE REPAIR CLAMPS

See Clamps, Pipe Repair

PIPE, SPIRAL, RIVETED AND WELDED

Armco Drainage & Metal Products, Inc., Middletown, O.
Biggs Boiler Wks., Co., The, E. Akron, O.
Naylor Pipe Co., Chicago, Ill.
Nikoh Tube Co., Chicago, Ill.
Taylor Forge & Pipe Wks., Chicago, Ill.
Wickwire Spencer Steel Div. of Colorado Fuel & Iron Corp., New York, N. Y.

PIPE, STEEL, ALLOY

Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Globe Steel Tubes Co., Milwaukee, Wis.
Michigan Pipe Co., Bay City, Mich.
National Tube Div., United States Steel Corp., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, O.
Taylor Forge & Pipe Wks., Chicago, Ill.
Trent Tube Co., East Troy, Wis.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE, STEEL, BUTT AND LAP WELDED

Bethlehem Steel Co., Bethlehem, Pa.
Biggs Boiler Works Co., The, E. Akron, O. (large diameter)
Byers Co., A. M., Pittsburgh, Pa.
Chicago Metal Mfg. Co., Chicago, Ill.
Claymont Steel Corp., Div. of Colorado Fuel & Iron Corp., Claymont, Del.
Electric Steel Foundry Co., Portland, Ore.
Fretz-Moon Tube Co., Butler, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Laclede Steel Co., St. Louis, Mo.
National Tube Div., United States Steel Corp., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, O.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y. (Specially fabricated)
South Chester Tube Co., Chester, Pa.
Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tippett & Wood, Phillipsburgh, N. J. (12 in. and larger)
Wheatland Tube Co., Philadelphia, Pa.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE, STEEL, SEAMLESS

Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Globe Steel Tubes Co., Milwaukee, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
National Tube Div., United States Steel Corp., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, O.
Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Timken Roller Bearing Co., Canton, O.
Trent Tube Co., East Troy, Wis.
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE, STEEL, STAINLESS

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
American Locomotive Co., Alco Products Div., Dunkirk, N. Y.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Carpenter Steel Co., Alloy Tube Div., Union, N. J.
Electric Steel Foundry Co., Portland, Ore.
Globe Steel Tubes Co., Milwaukee, Wis.
Michigan Pipe Co., Bay City, Mich.
National Tube Div., United States Steel Corp., Pittsburgh, Pa.
Pypon Co., Pittsburgh, Pa.
Republic Steel Corp., Steel and Tubes Div., Cleveland, O.
Timken Roller Bearing Co., Canton, O.
Trent Tube Co., East Troy, Wis.
Tri-Clover Machine Co., Kenosha, Wis.

PIPE, STONEWARE

General Ceramics & Steatite Corp., Keasbey, N. J.
Knight, Maurice A., Akron, O.
United States Stoneware Co., New York, N. Y.

PIPE SUPPORTS

See Hangers and Supports, Pipe

PIPE, TIN

Alpha Metals, Inc., Brooklyn, N. Y.
Division Lead Co., Summit, Ill.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Gardiner Metal Co., Chicago, Ill.
National Lead Co., New York, N. Y.
Northwest Lead Co., Seattle, Wash.
Standard Rolling Mills, Inc., Brooklyn, N. Y.

PIPE TONGS

See Tongs, Pipe

PIPE, TUBING, FITTINGS AND VALVES, CARBON AND GRAPHITE

General Ceramics & Steatite Corp., Keasbey, N. J.
National Carbon Co., Div. of Union Carbide & Carbon Corp., New York, N. Y.

PIPE AND TUBING, LEAD AND LEAD ALLOY

Alpha Metals, Inc., Brooklyn, N. Y.
Division Lead Co., Summit, Ill.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Flemm Lead Co., Inc., Long Island City, N. Y.
Gardiner Metal Co., Chicago, Ill.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
National Lead Co., New York, N. Y.
Northwest Lead Co., Seattle, Wash.
Rochester Lead Works, Inc., Rochester, N. Y.
Standard Rolling Mills, Inc., Brooklyn, N. Y.
United States Stoneware Co., New York, N. Y.

PIPE VISES

See Vises, Pipe

PIPE, VITRIFIED CLAY

Bowerston Shale Co., The, Bowerston, O.
General Ceramics & Steatite Corp., Keasbey, N. J.
Kaul Clay Mfg. Co., The, Toronto, O.
Logan Clay Product Co., The, Logan, O.
Robinson Clay Product Co., The, Akron, O.
Stillwater Clay Products Co., The, Cleveland, O.
Superior Clay Corp., The, Uhrichsville, O.
Texas Vitrified Pipe Co., Mineral Wells, Tex.
Universal Sewer Pipe Co., Cleveland, O.

PIPE, WOOD

Caldwell Co., W. E., Louisville, Ky.
Michigan Pipe Co., Bay City, Mich.
Santa Fe Tank & Tower Co., Los Angeles, Calif.

PIPE WRENCHES

See Wrenches, Pipe

PIPE, WROUGHT IRON

Byers Co., A. M., Pittsburgh, Pa.

PIPING, FABRICATED

See Bends, Expansion, Steam Pipe; Headers, Pipe, Welded; Coils, Pipe

PIPING IDENTIFICATON MARKERS

See Identification Markers for Piping Services

PISTON RINGS

See Rings, Piston

PITOT TUBES

See Tubes, Pitot

PITTSBURGH LOCK FORMING MACHINES

See Machines, Pittsburgh Lock Forming

PLASTIC PIPE AND PIPE FITTINGS

See Pipe, Plastic; Fittings, Pipe, Plastic

PLASTIC TUBING

See Tubing, Plastic

PLATES, FLOOR AND CEILING

Beaton & Cadwell Mfg. Co., New Britain, Conn.
Beaton & Corbin Mfg. Co., Southington, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Specialty Mfg. Co., Chicago, Ill.
Farley Sleeve & Hanger Co., Cleveland, O.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
G & H Mfg. Co., Philadelphia, Pa.
Grinnell Co., Providence, R. I.
Hupp Corp., Globe Stamping Div., Cleveland, O.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keeney Mfg. Co., Newington, Conn.
Little Mfg. Co., M. S., Hartford, Conn.
Ritter Pattern & Casting Co., Inc., New York, N. Y.
Russell Mfg. Co., John M., Div. of Risdon Mfg. Co., Naugatuck, Conn.
U. S. Plug & Fitting Co., Wellington, O.
Walworth Co., New York, N. Y.
Zurn Mfg. Co., J. A., Erie, Pa.

PLUG COCKS

See Valves, Plug

PLUG VALVES

See Valves, Plug

PLUGS, FUSIBLE, BOILER

Chicago Specialty Mfg. Co., Chicago, Ill.
Chiksan Co., Brea, Calif.
Division Lead Co., Summit, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lunkenheimer Co., Cincinnati, O.
Swift Lubricator Co., Inc., Elmira, N. Y.
Walworth Co., New York, N. Y.

PLUGS, PIPE, MAGNETIC, FOR REMOVING FERROUS PARTICLES

Magnetic Drain Plug Co., Wellington, O.
U. S. Plug & Fitting Co., Wellington, O.

PLUGS, REPAIR, FOR PIPE

Adams Pipe Repair Products, El Monte, Calif.

PLUGS, REPAIR, FOR TANKS

Adams Pipe Repair Products, El Monte, Calif.
Chicago Specialty Mfg. Co., Chicago, Ill.
Kenney Co., L. C., Chicago, Ill.
Standard Pressed Steel Co., Jenkintown, Pa.
U. S. Plug & Fitting Co., Wellington, O.

PORTS, OBSERVATION, BOILER

Bigelow Liptak Corp., Detroit, Mich.
Chicago Fire Brick Co., Chicago, Ill.
Detroit Stoker Co., Detroit, Mich.
Ess Instrument Co., Bergenfield, N. J.
Green Fire Brick Co., Mexico, Mo.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Plibrico Co., Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Ramtite Co., The, Chicago, Ill.
Reintjes Co., Geo. P., Kansas City, Mo.
Springfield Boiler Co., Springfield, Ill.

POSITIONERS, WELDING

See Welding and Cutting Apparatus, Oxy-Acetylene

POWER SHEARS

See Shears, Power

PREHEATERS, FUEL OIL

Alstrom Corp., Bronx, N. Y.
American District Steam Co., Inc., North Tonawanda, N. Y.
American Locomotive Co., Alco Products Div., Dunkirk, N. Y.
Andale Co., Philadelphia, Pa.
Bell & Gossett Co., Morton Grove, Ill.
Brown Fintube Co., The, Elyria, O.
Coen Co., San Francisco, Calif.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Crotty Mfg. Co., Flushing, L. I., N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Downingtown Iron Works, Downingtown, Pa.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Drying Systems, Inc., Chicago, Ill.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Electro-Therm, Inc., Silver Spring, Md.
Engineer Co., New York, N. Y.
Falcon Equipment Co., New Brighton, Pa.
Fluid Systems, Inc., New Haven, Conn.
General Fittings Co., Providence, R. I.
General Heaters & Regulators Co., East Chicago, Ind.
Griscom-Russell Co., Massillon, O.
Hauck Mfg. Co., Brooklyn, N. Y.
Heatron, Inc., York, Pa.
Hynes Electric Heating Div., Turbine Equipment Co., Westfield, N. J.
Industrial Engineering & Equipment Co., St. Louis, Mo. (Electric)
Johnson Corp., The, Three Rivers, Mich.
Kewanee-Ross Corp., Kewanee, Ill.
Leahy Mfg. Co., Los Angles, Calif.
Leyman Mfg. Corp., John H. McGowan Co., Div., Cincinnati, O.
Lientz Co., B. P., Kansas City, Mo.
Manning & Lewis Engineering Co., Newark, N. J.
National Pipe Bending Co., New Haven, Conn.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Peabody Engineering Corp., New York, N. Y.
Preferred Utilities Mfg. Corp., New York, N. Y.
Reliable Products Mfg. Co., Brooklyn, N. Y.
Rempe Co., Chicago, Ill.
Richmond Engineering Co., Inc., Richmond, Va.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Sims Co., Erie, Pa.
Staples & Pfeiffer, San Francisco, Calif.
Superior Combustion Industries, Inc., New York, N. Y.
Taco Heaters, Inc., Providence, R. I.
Thrush & Co., H. A., Peru, Ind.
Todd Shipyards Corp., Combustion Equipment Div., Elmhurst, N. Y.
Tranter Mfg., Inc., Lansing, Mich.
Trent Inc., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
Whitlock Mfg. Co., Hartford, Conn.
Wiegand Co., Edwin L., Pittsburgh, Pa. (Electric)
Yula Water Heaters Inc., New York, N. Y.

PREHEATERS AND STRESS RELIEVERS, ELECTRIC, FOR PIPE WELDS

Electric Arc, Inc., Newark, N. J.
Falcon Equipment Co., New Brighton, Pa.
Martin-Quaid Co., Philadelphia, Pa.
Trent Inc., Philadelphia, Pa.
Wiegand Co., Edwin L., Pittsburgh, Pa.

PRE-INSULATED PIPE

See Pipe, Pre-Insulated

PRESSURE BLOWERS

See Blowers, High Pressure

PRESSURE CONTROLLERS

See Regulators, Pressure

PRESSURE GAGES

See Gages, Indicating, Pressure

PRESSURE INDICATOR-CONTROLLERS

See Indicator-Controllers, Pressure

PRESSURE RECORDER-CONTROLLERS

See Recorder-Controllers, Pressure

PRESSURE RECORDERS

See Recorders, Pressure and Vacuum

PRESSURE REDUCING VALVES

See Valves, Pressure Reducing and Regulating

PRESSURE REGULATING VALVES

See Valves, Pressure Reducing and Regulating

PRESSURE REGULATORS

See Regulators, Pressure

PRESSURE SWITCHES

See Switches, Pressure and Vacuum

PROCESS HEATING SYSTEMS

See Systems, Process Heating, High Temperature

PROCESS STEAM SUPERHEATERS

See Superheaters, Process Steam

PROCESS AND STORAGE TANKS

See Tanks, Process and Storage

PROPANE VAPORIZERS

See Vaporizers

PROPELLER FANS

See Fans, Propeller

PROPELLER PUMPS

See Pumps, Propeller

PROPORTIONING PUMPS

See Pumps, Proportioning

PROTECTIVE COATINGS

See Coatings, Protective, for Metal

PROTECTORS, GAGE GLASS

Bache, Semon & Co., New York, N. Y.
Penberthy Injector Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Wright-Austin Co., Detroit, Mich.

PROTECTORS, PIPE COVERING

Bigelow-Liptak Corp., Detroit, Mich.
Carpenter & Paterson, Inc., East Boston, Mass.
Childers Mfg. Co., Houston, Tex.
Cinder Products Corp., Providence, R. I.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Grant Wilson Inc., Chicago, Ill.
Grinnell Co., Inc., Providence, R. I.
Leibfried Mfg. Corp., C. H., Brooklyn, N. Y.
Reynolds Metals Co., Louisville, Ky.
Ric-wiL Co., The, Barberton, O.
Smith Products Co., Detroit, Mich.
Weston Electrical Instrument Corp., Newark, N. J.

PSYCHROMETERS, MOTOR ASPIRATED

Bahnson Co., Winston-Salem, N. C.
Beckman & Whitley, Inc., San Carlos, Calif.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
G. M. Mfg. Co., New York, N. Y.
Garden City Instruments, Inc., Chicago, Ill.
Hill & Co., E. Vernon, Lake Geneva, Wis.
Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Scientific Instrument Co., Detroit, Mich.
Weston Electrical Instrument Corp., Newark, N. J.

PSYCHROMETERS, SLING AND HAND ASPIRATED

Airserco Mfg. Co., Inc., Pittsburgh, Pa.
American Moistening Co., Providence, R. I.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
G. M. Mfg. Co., New York, N. Y.
General Scientific Equipment Co., Philadelphia, Pa.
Grinnell Co., Inc., Providence, R. I.
H-B Instrument Co., Philadelphia, Pa.
Hill & Co., E. Vernon, Lake Geneva, Wis.
Johnson Service Co., Milwaukee, Wis.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Parks-Cramer Co., Fitchburg, Mass.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.

PSYCHROSTATS

See Humidistats

PULLEYS AND SHEAVES, FOR BELT DRIVES

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Browning Mfg. Co., Inc., Maysville, Ky.
Central Die Casting & Mfg. Co., Inc., Chicago, Ill. (V belt)

Chicago Die Casting Mfg. Co., Chicago, Ill. (v-type and flat type)
Climax Metal Products Co., Cleveland, O. (v-belt and variable pitch)
Congress Drives Div., Tann Corp., Detroit, Mich. (V belt—fractional and multiple horsepower)
Dayton Rubber Co., Dayton, O.
Dick Co., Inc., R. & J., Passaic, N. J. (Steel split)
DoAll Co., The, Des Plaines, Ill.
Dodge Mfg. Corp., Mishawaka, Ind.
Duro Metal Products Co., Chicago, Ill. (steel & diecast)
Ft. Worth Steel & Machinery Co., Ft. Worth, Texas
Gates Rubber Co., The, Denver, Colo.
Goldens' Foundry & Machine Co., Columbus, Ga. (Cast iron)
Jones Foundry Machine Co., W. A., Chicago, Ill. (flat)
Lau Blower Co., Dayton, O.
Lewellen Mfg. Co., Columbus, Ind.
Lovejoy Flexible Coupling Co., Chicago, Ill.
Maurey Mfg. Corp., Chicago, Ill. (v-belt steel and cast iron)
Medart Co., St. Louis, Mo.
Mercury Clutch Div., Automatic Steel Products, Inc., Canton, O.
Pyott Foundry & Machine Co., Chicago, Ill.
Scientiae Tool Co., Dayton, O. (variable pitch)
Speed Selector Inc., Cleveland, O. (variable pitch)
Sprout-Waldron & Co., Muncy, Pa.
Utility Fan Corp., Los Angeles, Calif.
V-Belt Clutch Co., Los Angeles, Calif.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
W. C. Products, Inc., Santa Monica, Calif.
Wood's Sons Co., T. B., Chambersburg, Pa.
Worthington Corp., Harrison, N. J. (v-type)

PULVERIZED COAL BURNERS

See Burners, Pulverized Coal

PUMP BASES

See Bases and Pads, Vibration Isolating

PUMP UNITS, FUEL OIL

See Units, Fuel Oil, Heating, Pumping and Straining

PUMP VALVES

See Valves, Pump

PUMPS, BOILER FEED

Aldrich Pump Co., Allentown, Pa.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Hydrovac, Div. Pitz Foundry, Inc., Brooklyn, N. Y.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Co., Aurora, Ill.
Buffalo Pumps, Inc., Buffalo, N. Y.
Byron Jackson Co., Los Angeles, Calif.
Chicago Pump Co., Chicago, Ill.
Cissell Mfg. Co., Inc., W. M., Louisville, Ky.
Cochrane Corp., Philadelphia, Pa.
Coffin Co., J. S., Jr., Englewood, N. J.
Columbus Steam Pump Wks., Co., Columbus, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cyclotherm Div., United States Radiator Corp., Oswego, N. Y.
Davidson Co., M. T., New York, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
Dean Hill Pump Co., Indianapolis, Ind.
Decatur Pump Co., Decatur, Ill.
DeLaval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Domestic Pump & Mfg. Corp., Shippensburg, Pa.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Eclipse Fuel Engineering Co., Rockford, Ill.
Economy Pumps Inc., Div. of Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Frederick Iron & Steel Inc., Frederick, Md.
Gardner-Denver Co., Quincy, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Jacuzzi Bros., Inc., Richmond, Calif.
Johnson Corp., The, Three Rivers, Mich.
Kingsford Foundry & Machine Wks., Oswego, N. Y.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Lattner Mfg. Co., P. M., Cedar Rapids, Iowa
Lawrence Pump & Engine Co., Lawrence, Mass.
Lecourtenay Co., Newark, N. J.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
McDonnell & Miller, Inc., Chicago, Ill.
Mears-Kane-Ofeldt, Inc., Div. S. T. Johnson Co., Bridgeport, Pa.
Nash Engineering Co., South Norwalk, Conn.
National Steam Pump Co., Upper Sandusky, O.
Oberdorfer Foundries, Inc., Syracuse, N. Y.
Pacific Pumping Co., Oakland, Calif.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Robbins & Myers, Inc., Springfield, O.
Roth Co., Roy E., Rock Island, Ill.
Schaub Engineering Co., Fred H., Chicago, Ill.
Skidmore Corp., St. Joseph, Mich.
Sterling, Inc., Milwaukee, Wis.
Stout & Sons, David, St. Louis, Mo.
Swaby Mfg. Co., Chicago, Ill.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
Weil Pump Co., Chicago, Ill.
Weinman Pump Mfg. Co., The, Columbus, O.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
Worthington Corp., Harrison, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

PUMPS, CENTRIFUGAL

Advance Pump Co., Berkeley, Calif.
Alliance Industries, Huntingden Valley, Pa.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
American Well Wks., Aurora, Ill.
Aurora Pump Co., Aurora, Ill.
Baker Mfg. Co., Evansville, Wis.
Barnes Manufacturing Co., Mansfield, O.
Barrett, Haentjens & Co., Hazleton, Pa.
Beckett & Co., Inc., Thomas, Dallas, Tex.
Bell & Gossett Co., Morton Grove, Ill.
Blaisdell Compressor Co., New York, N. Y.
Buffalo Pumps, Inc., Buffalo, N. Y.
Bump Pump Co., LaCrosse, Wis.
Byron Jackson Co., Los Angeles, Calif.
Carver Pump Co., Muscatine, Ia.
Chain Belt Co., Milwaukee, Wis.
Chempump Corp., Philadelphia, Pa. (magnetically driven)
Chicago Pump Co., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davidson Co., M. T., New York, N. Y.
Dayton Electric Mfg. Co., Chicago, Ill.
Dayton Pump & Mfg. Co., Dayton, O.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
Dean Hill Pump Co., Indianapolis, Ind.
Decatur Pump Co., Decatur, Ill.
DeLaval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Domestic Pump & Mfg. Corp., Shippensburg, Pa.
Dunham Co., C. A., Chicago, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Eastern Industries Inc., New Haven, Conn.
Economy Pumps Inc., Div. of Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pump Works, Inc., Brooklyn, N. Y.
Fostoria Pressed Steel Corp., Magnetic Pump Div., Fostoria, O.
Frederick Iron & Steel Inc., Frederick, Md.
Fulflo Specialties Co., Inc., The, Blanchester, O.
Gardner-Denver Co., Quincy, Ill.
Gelber Co., Samuel S., Chicago, Ill.
General Ceramics & Steatite Corp., Keasbey, N. J. (Chemical stoneware)
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Goodfellow Co., Inc., F. D., Memphis, Tenn.
Gorman-Rupp Co., Mansfield, O.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Jacuzzi Bros., Inc., Richmond, Calif.
Kenco Pump Co., Lorain, O.
Kingsford Foundry & Machine Wks., Oswego, N. Y.
La Bour Co., Inc., The, Elkhart, Ind.
Lancaster Pump & Mfg. Co., Lancaster, Pa.
Lawrence Pump Inc., Lawrence, Mass.
Lawrence Pump & Engine Co., Lawrence, Mass.
Lead Lined Iron Pipe Co., Wakefield, Mass. (lead lined and all lead)
Lecourtenay Co., Newark, N. J.
Lewis & Co., Inc., Chas. S., St. Louis, Mo.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Little Giant Vaporizer Co., Inc., Oklahoma City, Okla.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Marlow Pumps, Subsidiary of Bell & Gossett Co., Ridgewood, N. J.
Memphis Pump & Mfg. Co., Memphis, Tenn.
Morey, Dan, Los Angeles, Calif.
Morris Machine Works, Baldwinsville, N. Y.
Myers & Bro. Co., F. E., The, Ashland, O.
National Carbon Co., Div. of Union Carbide & Carbon Corp., New York, N. Y.
National Lead Co., New York, N. Y.
Oberdorfer Foundries, Inc., Syracuse, N. Y.
Pacific Pumping Co., Oakland, Calif.
Palmer Electric Co., Detroit, Mich.
Peerless of America, Inc., Chicago, Ill.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Pioneer Pump & Mfg. Co., Detroit, Mich.
Radiant Utilities Corp., Brooklyn, N. Y.
Ruthman Machinery Co., Cincinnati, O.
Saran Lined Pipe Co., Ferndale, Mich. (Saran Lined)
Schneible Co., Claude B., Detroit, Mich.
Skidmore Corp., St. Joseph, Mich.

Smith Corp., A. O., Milwaukee, Wis.
Standard Electric Mfg. Co., West Berlin, N. J.
Sterling, Inc., Milwaukee, Wis.
Sumo Pumps, Inc., Stamford, Conn. (for submerged operation)
Swaby Mfg. Co., Chicago, Ill.
Taber Pump Co., Buffalo, N. Y.
Trane Co., The, LaCrosse, Wis.
Tri-Clover Machine Co., Kenosha, Wis.
Union Steam Pump Co., Battle Creek, Mich.
Universal Mfg. Co., Berkeley, Calif.
Utility Appliance Corp., Los Angeles, Calif.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vanton Pump & Equipment Corp., New York, N. Y.
Warren Steam Pump Co., Inc., Warren, Mass.
Weil Pump Co., Chicago, Ill.
Weinman Pump Mfg. Co., The, Columbus, O.
Worthington Corp., Harrison, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

PUMPS, CONDENSATE, FOR REMOVING CONDENSATION FROM AIR CONDITIONING UNITS

Ashcraft Co., J. P., Dallas, Tex.
Egan Co., Inc., Walter H., Philadelphia, Pa.
Eastern Industries, Inc., New Haven, Conn.
Gelber Co., Samuel S., Chicago, Ill.
Little Giant Vaporizer Co., Inc., Oklahoma City, Okla.

PUMPS, CONDENSATION RETURN

Advance Pump Co., Berkeley, Calif.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Hydrovac, Div. Pitz Foundry, Inc., Brooklyn, N. Y.
American Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Co., Aurora, Ill.
Buffalo Pumps, Inc., Buffalo, N. Y.
Byron Jackson Co., Los Angeles, Calif.
Chicago Pump Co., Chicago, Ill.
Cissell Mfg. Co., Inc., W. M., Louisville, Ky.
Cochrane Corp., Philadelphia, Pa.
Coffin Co., J. S., Jr., Englewood, N. J.
Columbus Steam Pump Wks. Co., Columbus, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davidson Co., M. T., New York, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
Dean Hill Pump Co., Indianapolis, Ind.
Decatur Pump Co., Decatur, Ill.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Domestic Pump & Mfg. Corp., Shippensburg, Pa.
Dunham Co., C. A., Chicago, Ill.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Eastern Industries, Inc., New Haven, Conn.
Eclipse Fuel Engineering Co., Rockford, Ill.
Economy Pumps Inc., Div. of Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Faber Engineering Co., Inc., Philadelphia, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Frederick Iron & Steel Inc., Frederick, Md.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Heating Assurance, Inc., Spokane, Wash.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Ingersoll-Rand Co., New York, N. Y.
Jacuzzi Bros., Inc., Richmond, Calif.
Johnson Corp., The, Three Rivers, Mich.
Kenco Pump Co., Lorain, O.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Lattner Mfg. Co., P. M., Cedar Rapids, Iowa
Lawrence Pump & Engine Co., Lawrence, Mass.
Leyman Mfg. Corp., John H. McGowan Co., Div., Cincinnati, O.
Mears-Kane-Ofeldt, Inc., Div. S. T. Johnson Co., Bridgeport, Pa.
Myers & Bro. Co., F. E., The, Ashland, O.
Nash Engineering Co., South Norwalk, Conn.
Oberdorfer Foundries, Inc., Syracuse, N. Y.
Pacific Pumping Co., Oakland, Calif.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Roth Co., Roy E., Rock Island, Ill.
Schaub Engineering Co., Fred H., Chicago, Ill.
Sellers Engineering Co., Chicago, Ill.
Skidmore Corp., St. Joseph, Mo.
Sterling, Inc., Milwaukee, Wis.
Stout & Sons, David, St. Louis, Mo.
Swaby Mfg. Co., Chicago, Ill.
Trane Co., The, LaCrosse, Wis.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
Weil Pump Co., Chicago, Ill.
Weinman Pump Mfg. Co., The, Columbus, O.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
Worthington Corp., Harrison, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

PUMPS, EVAPORATIVE COOLER

Goulds Pumps, Inc., Seneca, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Midwest Mfg. Co., Lawrence, Kans.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Wright Mfg. Co., Phoenix, Ariz.

PUMPS, DEEP WELL, TURBINE

American Well Wks., Aurora, Ill.
Aurora Pump Co., Aurora, Ill.
Byron Jackson Co., Los Angeles, Calif.
Davidson Co., M. T., New York, N. Y.
Decatur Pump Co, Decatur, Ill. (shallow well)
Deming Co., Salem, O.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Guild & Garrison, Inc., Brooklyn, N. Y.
Jacuzzi Bros., Inc., Richmond, Calif.
Johnson Pump Co., Pasadena, Calif.
Lancaster Pump & Mfg. Co., Lancaster, Pa.
Layne & Bowler, Inc., Memphis, Tenn.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Pacific Pumping Co., Oakland, Calif.
Peerless Pump Div, Food Machinery & Chemical Corp., Los Angeles, Calif.
Smith Corp., A. O., Milwaukee, Wis.
Universal Mfg. Co., Berkeley, Calif.
Whitewater Pump Co., Inc., Whitewater, Wis.
Worthington Corp., Harrison, N. J.

PUMPS, FIRE

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Co., Aurora, Ill.
Barnes Manufacturing Co., Mansfield, O.
Buffalo Pumps, Inc., Buffalo, N. Y.
Chicago Pump Co., Chicago, Ill.
Davidson Co., M. T., New York, N. Y.
De Laval Steam Turbine Co., Trenton, N. J.
Economy Pumps Inc., Div. of Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Frederick Iron & Steel Inc., Frederick, Md.
Gorman-Rupp Co., Mansfield, O.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Jacuzzi Bros., Inc., Richmond, Calif.
Layne & Bowler, Inc., Memphis, Tenn.
Lecourtenay Co., Newark, N. J.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Marlow Pumps, Subsidiary of Bell & Gossett Co., Ridgewood, N. J.
Myers & Bro. Co., F. E., The, Ashland, O.
Oberdorfer Foundries, Inc., Syracuse, N. Y.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles Calif.
Viking Pump Co., Cedar Falls, Ia.
Warren Steam Pump Co., Inc., Warren, Mass.
Worthington Corp., Harrison, N. J.

PUMPS, HIGH PRESSURE, HYDRAULIC

Aldrich Pump Co., Allentown, Pa.
American Engineering Co., Philadelphia, Pa.
American Instrument Co., Inc., Silver Spring, Md.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Blackhawk Mfg. Co., Milwaukee, Wis.
Byron Jackson Co., Los Angeles, Calif.
C C Pump Mfg. Div., Palmyra, N. J.
Carpenter Mfg. Corp., The, Cleveland, O. (hand)
Commercial Shearing & Stamping Co., Youngstown, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davidson Co., M. T., New York, N. Y.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Gorman-Rupp Co., Mansfield, O.
Guild & Garrison, Inc., Brooklyn, N. Y.
Kobe Inc., Div. of Dresser Equipment Co., Huntington Park, Calif.
Ledeen Mfg. Co., Los Angeles, Calif.
Milton Roy Co., Philadelphia, Pa.
National Steam Pump Co., Upper Sandusky, O.
Robbins & Myers, Inc., Springfield, O.
Roper Corp., Geo. D., Rockford, Ill.
Royalton Co., Inc., Gasport, N. Y.
Struthers Wells Corp., Titusville, Pa.
Texsteam Corp., Houston, Tex.
Union Steam Pump Co., Battle Creek, Mich.
Viking Pump Co., Cedar Falls, Ia.
Warren Steam Pump Co., Inc., Warren, Mass.
Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.

PUMPS, HYDROSTATIC TEST, HAND-OPERATED

Alten Foundry & Machine Wks., Inc., Lancaster, O.
Capitol Machine Wks., Oakland, Calif.
Dudgeon, Inc., Richard, Brooklyn, N. Y.
Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.

PUMPS, LIQUID REFRIGERANT CIRCULATING

Alliance Industries, Huntingden Valley, Pa.
American-Marsh Pumps, Inc., Battle Creek, Mich.

Aurora Pump Co., Aurora, Ill.
Byron Jackson Co., Los Angeles, Calif.
Chempump Corp., Philadelphia, Pa.
Chicago Pump Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davidson Co., M. T., New York, N. Y.
De Laval Steam Turbine Co., Trenton, N. J.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Economy Pumps Inc., Div. of Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Fostoria Pressed Steel Corp., Magnetic Pump Div., Fostoria, O.
Frick Co., Waynesboro, Pa.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Heatron, Inc., York, Pa.
Ingersoll-Rand Co., New York, N. Y.
Jacuzzi Bros., Inc., Richmond, Calif.
Lewis & Co., Chas. S., St. Louis, Mo.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Pioneer Pump & Mfg. Co., Detroit, Mich.
Roper Corp., Geo. D., Rockford, Ill.
Roth Co., Roy E., Rock Island, Ill.
Viking Pump Co., Cedar Falls, Ia.
Vilter Mfg. Co., Milwaukee, Wis.
Warren Steam Pump Co., Inc., Warren, Mass.
Worthington Corp., Harrison, N. J.

PUMPS, PROPELLER

American Well Works, Aurora, Ill.
Byron Jackson Co., Los Angeles, Calif.
Economy Pumps Inc., Div. of Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Frederick Iron & Steel Inc., Frederick, Md.
Haertel Co., Walter, Minneapolis, Minn.
Ingersoll-Rand Co., New York, N. Y.
Jacuzzi Bros., Inc., Richmond, Calif.
Johnston Pump Co., Pasadena, Calif.
Lawrence Pumps, Inc., Lawrence, Mass.
Morris Machine Wks., Baldwinsville, N. Y.
Pacific Pumping Co., Oakland, Calif.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles Calif.
Pioneer Pump & Mfg. Co., Detroit, Mich.
Ruthman Machinery Co., Cincinnati, O.
Tri-Clover Machine Co., Kenosha, Wis.
Warren Steam Pump Co., Inc., Warren, Mass.
Worthington Corp., Harrison, N. J.

PUMPS, PROPORTIONING

American Instrument Co., Inc., Silver Spring, Md.
Bird-Archer Co., Philadelphia, Pa.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Bruner Corp., Milwaukee, Wis.
C C Pump Mfg. Div., Palmyra, N. J.
Cochrane Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Dearborn Chemical Co., Chicago, Ill.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Jacuzzi Bros., Inc., Richmond, Calif.
Madden Corp., The, Chicago, Ill.
Marco Co., Inc., Wilmington, Del.
Milton Roy Co., Philadelphia, Pa.
Nelson Chemical Pumps, Casper, Wyo.
Precision Machine Co., Somerville, Mass.
% Proportioneers, Inc., %, Providence, R. I.
Philadelphia Pump and Machinery Co., Inc., Wynnewood, Pa.
Robbins & Myers, Inc., Springfield, O.
Texsteam Corp., Houston, Tex.
Wallace & Tiernan Co., Inc., Newark, N. J.

PUMPS, RECIPROCATING

Aldrich Pump Co., Allentown, Pa.
American Hard Rubber Co., New York, N. Y. (Rubber and Rubber lined)
American-Marsh Pumps, Inc., Battle Creek, Mich
Columbus Steam Pump Wks., Columbus, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Davidson Co., M. T., New York, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
Deming Co., Salem, O.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Duro Co., Dayton, O.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Gardner-Denver Co., Quincy, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Gray Company, Inc., Minneapolis, Minn.
Guild & Garrison, Inc., Brooklyn, N. Y.
Healey Co., Lee, Glendale, Calif.
Hills-McCanna Co., Chicago, Ill.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Ingersoll-Rand Co., New York, N. Y.
Lancaster Pump & Mfg. Co., Lancaster, Pa.
Leyman Mfg. Corp., John H. McGowan Co., Div., Cincinnati, O.
Milton Roy Co., Philadelphia, Pa.
Myers & Bro. Co., F. E., The, Ashland, O.
National Steam Pump Co., Upper Sandusky, O.
National Water Lift Inc., Kalamazoo, Mich.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Royalton Co., Inc., Gasport, N. Y.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Uniflow Mfg. Co., Erie, Pa.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
Whitewater Pump Co., Inc., Whitewater, Wis.
Worthington Corp., Harrison, N. J.

PUMPS, ROTARY

American Engineering Co., Philadelphia, Pa.
American Hard Rubber Co., New York, N. Y. (Rubber and rubber lined)
Beach-Russ Co., New York, N. Y.
Blackmer Pump Co., Grand Rapids, Mich.
Bowser, Inc., Fort Wayne, Ind.
Bump Pump Co., La Crosse, Wis.
Chicago Pneumatic Tool Co., New York, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Duriron Co., Inc., The, Dayton, O. (Acid resisting)
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Eastern Industries, Inc., New Haven, Conn.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pump Wks., Inc., Brooklyn, N. Y.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Gray Co., Inc., Minneapolis, Minn.
Hypro Engineering Co., Minneapolis, Minn.
Jabsco Pump Co., Burbank, Calif.
Kinney Mfg. Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Lammert & Mann Co., Chicago, Ill.
Leyman Mfg. Corp., John H. McGowan Co., Div., Cincinnati, O.
Marco Co., Inc, Wilmington, Del.
May Oil Burner Div., May Fuel Oil Corp., Baltimore, Md.
Nash Engineering Co., South Norwalk, Conn.
Oberdorfer Foundries, Inc., Syracuse, N. Y.
Pioneer Pump & Mfg. Co., Detroit, Mich.
Polo Pump Co., Polo, Ill.
Robbins & Myers, Inc., Springfield, O.
Roots-Connersville Blower Div., Connersville, Ind.
Roper Corp., Geo. D., Rockford, Ill.
Roth Co., Roy E., Rock Island, Ill.
St. Louis Tool Co., St. Louis, Mo.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Sier Bath Gear & Pump Co., Inc., North Bergen, N. J.
Sundstrand Machine Tool Co., Hydraulic Div., Rockford, Ill. (for oil burners)
Taber Pump Co., Buffalo, N. Y.
Trimount Rotary Power Co., Dedham, Mass.
Tuthill Pump Co., Chicago, Ill.
Vanton Pump and Equipment Corp., New York, N. Y.
Viking Pump Co., Cedar Falls, Ia.
Waukesha Foundry Co., Waukesha, Wis.
Webster Electric Co., Racine, Wis.
Worthington Corp., Harrison, N. J.
Yale & Towne Mfg. Co., Stamford, Conn.

PUMPS, SEWAGE AND SLUDGE

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
American Well Works, Aurora, Ill.
Aurora Pump Co., Aurora, Ill.
Barnes Manufacturing Co., Mansfield, O.
Buffalo Pumps, Inc., Buffalo, N. Y.
Chicago Pump Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davison Co., M. T., New York, N. Y.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Economy Pumps Inc., Div. of Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Frederick Iron & Steel Inc., Frederick, Md.
Gardner-Denver Co., Quincy, Ill.
Gorman-Rupp Co., Mansfield, O.
Guild & Garrison, Inc., Brooklyn, N. Y.
Healey Co., Lee, Glendale, Calif.
Ingersoll-Rand Co., New York, N. Y.
Jabsco Pump Co., Burbank, Calif.
Jacuzzi Bros., Inc., Richmond, Calif.
Kingsford Foundry & Machine Works, Oswego, N. Y.
Lawrence Pumps, Inc., Lawrence, Mass.
Marlow Pumps, Subsidiary of Bell & Gossett Co., Ridgewood, N. J.
Morris Machine Wks., Baldwinsville, N. Y.
Pacific Pumping Co., Oakland, Calif.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Robbins & Myers, Inc., Springfield, O.
Swaby Mfg. Co., Chicago, Ill.
Weil Pump Co., Chicago, Ill.
Weinman Pump Mfg. Co., The, Columbus, O.
Whittington Pump & Engineering Corp., Indianapolis, Ind.

Worthington Corp., Harrison, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

PUMPS, SEWAGE AND SLUDGE, SUBMERSIBLE

American Well Wks., Aurora, Ill.
Economy Pumps Inc., Div. of Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Egan Co., Inc., Walter H., Philadelphia, Pa.
Lawrence Pumps, Inc., Lawrence, Mass.
Weil Pump Co., Chicago, Ill.

PUMPS, STEAM

American-Marsh Pumps, Inc., Battle Creek, Mich.
Columbus Steam Pump Wks., Co., Columbus, O.
Davidson Co., M. T., New York, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Gardner-Denver Co., Quincy, Ill.
Guild & Garrison, Inc., Brooklyn, N. Y.
Jacuzzi Bros., Inc., Richmond, Calif.
Leyman Mfg. Corp., John H. McGowan Co., Div., Cincinnati, O.
National Steam Pump Co., Upper Sandusky, O.
Penberthy Injector Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
Worthington Corp., Harrison, N. J.

PUMPS, SUMP

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Co., Aurora, Ill.
Barnes Mfg. Co., Mansfield, O.
Barrett, Haentjens & Co., Hazleton, Pa.
Bruner Corp., Milwaukee, Wis.
Buffalo Pumps, Inc., Buffalo, N. Y.
Byron Jackson Co., Los Angeles, Calif.
Chicago Pneumatic Tool Co., New York, N. Y.
Chicago Pump Co., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
Davidson Co., M. T., New York, N. Y.
Dayton Electric Mfg. Co., Chicago, Ill.
Decatur Pump Co., Decatur, Ill.
Deming Co., Salem, O.
Duro Co., Dayton, O.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Eastern Industries, Inc., New Haven, Conn.
Economy Pumps Inc., Div. of Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Frederick Iron & Steel Inc., Frederick, Md.
Friermood Machine Works, Converse, Ind.
Gardner-Denver Co., Quincy, Ill.
Gorman-Rupp Co., Mansfield, O.
Goulds Pump, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Healey Co., Lee, Glendale, Calif.
Ingersoll-Rand Co., New York, N. Y.
Jabsco Pump Co., Burbank, Calif.
Jacuzzi Bros., Inc., Richmond, Calif.
Johnston Pump Co., Pasadena, Calif.
Kenco Pump Co., Lorain, O.
Kingsford Foundry & Machine Wks., Oswego, N. Y.
Kol-Master Corp., Oregon, Ill.
Lancaster Pump & Mfg. Co., Lancaster, Pa.
Lawrence Pumps, Inc., Lawrence, Mass.
Lawrence Pump & Engine Co., Lawrence, Mass.
Leyman Mfg. Corp., John H. McGowan Co., Div., Cincinnati, O.
Marlow Pumps, Subsidiary of Bell & Gossett Co., Ridgewood, N. J.
Morris Machine Wks., Baldwinsville, N. Y.
Myers & Bro. Co., F. E., The, Ashland, O.
Noera Mfg. Co., Div., Chase Brass & Copper Co., Waterbury, Conn.
Oxygen Equipment & Service Co., Chicago 20, Ill.
Pacific Pumping Co., Oakland, Calif.
Peerless of America, Inc., Chicago, Ill.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Penberthy Injector Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Peters-Dalton, Inc., Detroit, Mich.
Quiet-Heet Mfg. Corp., Newark, N. J.
Radiant Utilities Corp., Brooklyn, N. Y.
Robbins & Myers, Inc., Springfield, O.
Roth Co., Roy E., Rock Island, Ill.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Skidmore Corp., St. Joseph, Mich.
Standard Electric Mfg. Co., West Berlin, N. J.
Swaby Mfg. Co., Chicago, Ill.
Taber Pump Co., Buffalo, N. Y.
Thor Power Tool Co., Aurora, Ill.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Uniflow Mfg. Co., Erie, Pa.
Union Steam Pump Co., Battle Creek, Mich.
Universal Mfg. Co., Berkeley, Calif.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Wade Mfg. Co., Elgin, Ill.
Warren Steam Pump Co., Inc., Warren, Mass.
Weil Pump Co., Chicago, Ill.
Weinman Pump Mfg. Co., The, Columbus, O.
Whitewater Pump Co., Inc., Whitewater, Wis.
Worthington Corp., Harrison, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

PUMPS, SUMP, SUBMERSIBLE

Byron Jackson Co., Los Angeles, Calif.
Decatur Pump Co., Decatur, Ill.
Deming Co., Salem, O.
Kenco Pump Co., Lorain, O.
Milton Roy Co., Philadelphia, Pa.
Penberthy Injector Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Pioneer Pump & Mfg. Co., Detroit, Mich.
Universal Mfg. Co., Berkeley, Calif.
Weil Pump Co., Chicago, Ill.

PUMPS, VACUUM

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Aminco Refrigeration Products Co., Detroit, Mich.
Barrett, Haentjens & Co., Hazleton, Pa.
Beach-Russ Co., New York, N. Y.
Bury Compressor Co., Erie, Pa.
Chicago Pneumatic Tool Co., New York, N. Y.
Chicago Pump Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Daigger & Co., A., Chicago, Ill.
Davidson Co., M. T., New York, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
De Laval Steam Turbine Co., Trenton, N. J.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Domestic Pump & Mfg. Corp., Shippensburg, Pa.
Dunham Co., C. A., Chicago, Ill.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Economy Pumps Inc., Div. of Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Eisler Engineering Co., Inc., Newark, N. J.
Electric Sprayit Co., The, Sheboygan, Wis.
Foster Pump Wks., Inc., Brooklyn, N. Y.
Foster Wheeler Corp., New York, N. Y.
Fuller Co., Catasaqua, Pa.
Gardner-Denver Co., Quincy, Ill.
General Ceramics & Steatite Corp., Keasbey, N. J. (Chemical stoneware)
Guild & Garrison, Inc., Brooklyn, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Jabsco Pump Co., Burbank, Calif.
Joy Mfg. Co., Pittsburgh, Pa.
Kinney Mfg. Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Lammert & Mann Co., Chicago, Ill.
Leyman Mfg. Corp., John H. McGowan Co., Div., Cincinnati, O.
Nash Engineering Co., South Norwalk, Conn.
National Steam Pump Co., Upper Sandusky, O.
Oxygen Equipment & Service Co., Chicago, Ill.
Penberthy Injector Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Pioneer Pump & Mfg. Co., Detroit, Mich.
Research Vacuum Supply Co., Chicago, Ill.
Roots-Connersville Blower Div., Connersville, Ind.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Skidmore Corp., St. Joseph, Mich.
Stokes Machine Co., F. J., Philadelphia, Pa.
Trimount Rotary Power Co., Dedham, Mass.
Viking Pump Co., Cedar Falls, Ia.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
Will Corp., Rochester, N. Y.
Worthington Corp., Harrison, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

PUMPS, VACUUM HEATING

American Hydrovac, Div. Pitz Foundry, Inc., Brooklyn, N. Y.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Chicago Pump Co., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
Domestic Pump & Mfg. Corp., Shippensburg, Pa.
Dunham Co., C. A., Chicago, Ill.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Economy Pumps Inc., Div. of Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Faber Engineering Co., Inc., Philadelphia, Pa.
Gardner-Denver Co., Quincy, Ill.
Guild & Garrison, Inc., Brooklyn, N. Y.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Leyman Mfg. Corp., John H. McGowan Co., Div., Cincinnati, O.
Nash Engineering Co., South Norwalk, Conn.
Skidmore Corp., St. Joseph, Mich.
Sterling, Inc., Milwaukee, Wis.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
Worthington Corp., Harrison, N. J.

PUMPS, VISCOUS LIQUIDS AND HEAVY MATERIALS

Aldrich Pump Co., Allentown, Pa.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.

American-Marsh Pumps, Inc., Battle Creek, Mich.
Beach-Russ Co., New York, N. Y.
Blackmer Pump Co., Grand Rapids, Mich.
Buffalo Pumps, Inc., Buffalo, N. Y.
Bump Pump Co., La Crosse, Wis.
C C Pump Mfg. Div., Palmyra, N. J.
Chicago Pump Co., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Davidson Co., M. T., New York, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
De Laval Steam Turbine Co., Trenton, N. J.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Economy Pumps Inc., Div. of Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Engineer Co., New York, N. Y.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pump Wks., Inc., Brooklyn, N. Y.
Frederick Iron & Steel Inc., Frederick, Md.
Gardner-Denver Co., Quincy, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Gray Co., Inc., Minneapolis, Minn.
Guild & Garrison, Inc., Brooklyn, N. Y.
Healey Co., Lee, Glendale, Calif.
Ingersoll-Rand Co., New York, N. Y.
Jabsco Pump Co., Burbank, Calif.
Jacuzzi Bros., Inc., Richmond, Calif.
Kingsford Foundry & Machine Wks., Oswego, N. Y.
Kinney Mfg. Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Lawrence Pumps, Inc., Lawrence, Mass.
Lawrence Pump & Engine Co., Lawrence, Mass.
Leyman Mfg. Corp., John H. McGowan Co., Div., Cincinnati, O.
Madden Corp., The, Chicago, Ill.
Marco Co., Inc., Wilmington, Del.
Milton Roy Co., Philadephia, Pa.
Peerless Pump Div., Food Machinery and Chemical Corp., Los Angeles, Calif.
Pioneer Pump & Mfg. Co., Detroit, Mich.
Robbins & Myers, Inc., Springfield, O.
Roots-Connersville Blower Div., Connersville, Ind.
Roper Corp., Geo. D., Rockford, Ill.
Royalton Co., Inc., Gasport, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Taber Pump Co., Buffalo, N. Y.
Tuthill Pump Co., Chicago, Ill.
Union Steam Pump Co., Battle Creek, Mich.
Vanton Pump & Equipment Corp., New York, N. Y.
Viking Pump Co., Cedar Falls, Ia.
Warren Steam Pump Co., Inc., Warren, Mass.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
Worthington Corp., Harrison, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

PUNCHES, SHEET METAL

Blackhawk Mfg. Co., Milwaukee, Wis.
Bliss Co., E. W., Canton, O.
Callahan Can Machine Co., Inc., Brooklyn, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Cleveland Punch & Shear Wks. Co., Cleveland, O.
Excelsior Tool & Machine Co., East St. Louis, Ill.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore Co., Beloit, Wis.
Henry & Wright, Div. of Emhart Mfg. Co., Hartford, Conn.
Kidder Mfg. Co., Inc., J. F., Burlington, Vt.
Leslie Welding Co., Inc., Chicago, Ill.
M-M-A, Inc., Lancaster, Pa.
Niagara Machine & Tool Wks., Buffalo, N. Y.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Parker-Kalon Div., General American Transportation Corp., New York, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Perkins Machine Co., Warren, Mass.
Reiner & Campbell Co., Inc., Newark, N. J.
Swaine Mfg. Co., Fred J., St. Louis, Mo.
Thor Tool & Die Co., San Leandro, Calif.
Webb Corp., The, Webb City, Mo.
Whitney Mfg. Co., W. A., Rockford, Ill.
Whitney Metal Tool Co., Rockford, Ill.
Weidemann Machine Co., Philadelphia, Pa.
Zeh & Hahnemann Co., Newark, N. J.

PURGERS, REFRIGERANT GAS

Armstrong Machine Works, Three Rivers, Mich.
Frick Co., Waynesboro, Pa.
Mueller Brass Co., Port Huron, Mich.
Reco Products Div., Recony Corp., New York, N. Y.
Vilter Mfg. Co., Milwaukee, Wis.
York Corp., York, Pa.

PUSHERS, PIPE, HYDRAULIC

Blackhawk Mfg. Co., Milwaukee, Wis.
Dudgeon, Inc., Richard, Brooklyn, N. Y.
Giant Mfg. Co., Council Bluffs, Ia.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.

RACKS, STORAGE, PIPE

Adams Co., The, Dubuque, Ia.
Berger Mfg. Div., Republic Steel Corp., Canton, Ohio
Unistrut Products Co., Chicago, Ill.

RADIANT HEAT THERMOSTATS

See Thermostats, Radiant Heat

RADIANT HEATING AND COOLING

See Coils and Panels, Radiant Heating, Prefabricated

RADIANT HEATING ELECTRICAL CONDUCTORS

See Conductors, Electrical, for Radiant Heating

RADIATION, BASEBOARD

For special fittings, see Fittings, Pipe, Special, for Baseboard Radiation

RADIATION, BASEBOARD, FERROUS

American Radiator & Standard Sanitary Corp., Pittsburgh, Pa
Autorad Inc., Chicago, Ill.
Baseline Mfg. Co., Minneapolis, Minn.
Brown Products Co., Forest Hills, N. Y.
Burnham Corp., Boiler Div., Irvington, N. Y.
Crane Co., Chicago, Ill.
Edwards Engineering Corp., Pompton Plains, N. J.
Hooper Engineering Co., Liberty Center, O.
Koven & Bro., L. O., Inc., Jersey City, N. J.
Kritzer Radiant Coils, Inc., Chicago, Ill.
Lee Vine Fin-Tube Radiator Co., Inc., New Haven, Conn.
Rempe Co., Chicago, Ill.
Rittling Corp., The, Buffalo, N. Y.
Slant-Fin Radiator Corp., Brooklyn, N. Y.
Smith Co., Inc., H. B., The, Westfield, Mass.
Sterling Radiator Co., Inc., Westfield, Mass.
Trane Co.. The, La Crosse, Wis.
Union Asbestos & Rubber Co., Chicago, Ill.
Utica Radiator Corp., Utica, N. Y.
Vulcan Radiator Co., Hartford, Conn.
Waterfilm Boilers, Inc., Jersey City, N. J.
Weil-McLain Co., Michigan City, Ind.

RADIATION, BASEBOARD, NON-FERROUS

American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Baseline Mfg. Corp., Minneapolis, Minn.
Brown Products Co., Forest Hills, N. Y.
Bush Mfg. Co., West Hartford, Conn.
Columbia Boiler Co., Pottstown, Pa.
Dunham Co., C. A., Chicago, Ill.
Dewey-Shephard Boiler Co., Indianapolis, Ind.
Ejay Mfg. Co., Winsted, Conn.
Fedders-Quigan Corp., Buffalo, N. Y.
G & O Mfg. Co., New Haven, Conn.
Hooper Engineering Co., Liberty Center, O.
Huron Boiler Co., Detroit, Mich.
Kritzer Radiant Coils, Inc., Chicago, Ill.
National Radiator Co., The, Johnstown, Pa.
Nesbitt, Inc., John J., Philadelphia, Pa.
Radiant Baseboard Panels, Inc., New Britain, Conn.
Radiant-Ray Radiation, Inc., New Britain, Conn.
Rempe Co., Chicago, Ill.
Republic Products Co., Philadelphia, Pa.
Rittling Corp., Buffalo, N. Y.
Schemenauer Mfg. Corp., Holland, O.
Shaw-Perkins Mfg. Co., Pittsburgh, Pa.
Sterling Radiator Co., Inc., Westfield, Mass.
Tenney Engineering, Inc., Newark, N. J.
Thermo-Base Div., Gerwin Industries, Michigan, Ind. (warm air baseboards)
Trane Co., The, La Crosse, Wis.
Tuttle & Bailey, Inc., New Britain, Conn.
Union Asbestos & Rubber Co., Chicago, Ill.
United States Radiator Corp., Detroit, Mich.
Vulcan Radiator Co., Hartford, Conn.
Webster & Co., Warren, Camden, N. J.
Young Radiator Co., Racine, Wis.

RADIATION, CONVECTION TYPE, ELECTRIC HEATING ELEMENT

Hynes Electric Heating Div., Turbine Equipment Co., Westfield, N. J.
Paley Mfg. Corp., Brooklyn, N. Y.
Wesix Electric Heater Co., San Francisco, Calif.

RADIATION, CONVECTION TYPE, FERROUS

American Radiator & Standard Sanitary Corp., Pittsburgh, Pa
Autorad Inc., Chicago, Ill.
Brown Fintube Co., The, Elyria, O.
Brown Products Co., Forest Hills, N. Y.
Kritzer Radiant Coils, Inc., Chicago, Ill.
Murray Mfg. Co., D. J., Wausau, Wis.
National Radiator Co., The, Johnstown, Pa.
Rempe Co., Chicago, Ill.
Rittling Corp., The, Buffalo, N. Y.
Schemenauer Mfg. Corp., Holland, O.
Stedco Products, Wilkes-Barre, Pa.
Tenney Engineering Inc., Newark, N. J.

Union Asbestos & Rubber Co., Chicago, Ill.
United States Radiator Corp., Detroit, Mich.
Webster & Co., Warren, Camden, N. J.
Weil-McLain Co., Chicago, Ill.

RADIATION, CONVECTION TYPE, NON-FERROUS

Acme Industries, Inc., Jackson, Mich.
Airtherm Mfg. Co., St. Louis, Mo.
American Coils Co., Newark, N. J.
American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Beacon-Morris Corp., Boston, Mass.
Brown Fintube Co., The, Elyria, O.
Brown Products Co., Forest Hills, N. Y.
Bush Mfg. Co., West Hartford, Conn.
Dunham Co., C. A., Chicago, Ill.
Fedders-Quigan Corp., Buffalo, N. Y.
G. & O. Mfg. Co., New Haven, Conn.
Kehm Corp., The, Chicago, Ill.
Kramer Trenton Co., Trenton, N. J.
Kritzer Radiant Coils, Inc., Chicago, Ill.
Modine Mfg. Co., Racine, Wis.
National Radiator Co., The, Johnstown, Pa.
Nesbitt Inc., John J., Philadelphia, Pa.
Peerless of America, Inc., Chicago, Ill.
Penn Boiler & Burner Mfg. Corp., Lancaster, Pa.
Refrigeration Economics Co., Inc., Canton, O.
Republic Products Co., Philadelphia, Pa.
Rittling Corp., The, Buffalo, N. Y.
Rome-Turney Radiator Co., Rome, N. Y.
Schemenauer Mfg. Corp., Holland, O.
Shaw-Perkins Mfg. Co., Pittsburgh, Pa.
Tenney Engineering Inc., Newark, N. J.
Trane Co., The, La Crosse, Wis.
Tuttle & Bailey, Inc., New Britain, Conn.
Union Asbestos & Rubber Co., Chicago, Ill.
United States Radiator Corp., Detroit, Mich.
Universal Convector Corp., New York, N. Y.
Vapor Heating Corp., Chicago, Ill.
Webster & Co., Warren, Camden, N. J.
Young Radiator Co., Racine, Wis.

RADIATION, DIRECT

American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Burnham Corp., Boiler Div., Irvington, N. Y.
Clifford Mfg. Co., Div. of Standard-Thomson Corp., Waltham, Mass. (For aircraft)
Clow & Sons, James B., Chicago, Ill. (Gas fired)
Crane Co., Chicago, Ill.
Dunkirk Radiator Corp., Dunkirk, N. Y.
Murray Mfg. Co., D. J., Wausau, Wis.
National Radiator Co., The, Johnstown, Pa.
Rittling Corp., The, Buffalo, N. Y.
United States Radiator Corp., Detroit, Mich.
Utica Radiator Corp., Utica, N. Y.
Weil-McLain Co., Michigan City, Ind.
Wilson Engineering Corp., Chicago, Ill.

RADIATION, FIN TUBE TYPE

American Coils Co., Newark, N. J.
Auburn Burner Co., Auburn, Ind.
Autorad Inc., Chicago, Ill.
Baseline Mfg. Co., Minneapolis, Minn.
Brown Products Co., Forest Hills, N. Y.
Bush Mfg. Co., West Hartford, Conn.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Dunham Co., C. A., Chicago, Ill.
Edwards Engineering Corp., Pompton Plains, N. J.
Fedders-Quigan Corp., Buffalo, N. Y.
G & O Mfg. Co., New Haven, Conn.
Kramer Trenton Co., Trenton, N. J.
Kritzer Radiant Coils, Inc., Chicago, Ill.
Lee Vine Fin-Tube Radiator Co., Inc., New Haven, Conn.
National Radiator Co., The, Johnstown, Pa.
Nesbitt, Inc., John J., Philadelphia, Pa.
Peerless of America, Inc., Chicago, Ill.
Radiant-Ray Radiation, Inc., New Britain, Conn.
Refrigeration Economics Co., Inc., Canton, O.
Rempe Co., Chicago, Ill.
Rittling Corp., The, Buffalo, N. Y.
Schemenauer Mfg. Corp., Holland, O.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Shaw-Perkins Mfg. Co., Pittsburgh, Pa.
Slant-Fin Radiator Corp., Brooklyn, N. Y.
Smith Co., Inc., H. B., The, Westfield, Mass.
Stedco Products, Wilkes-Barre, Pa.
Sterling Radiator Co., Inc., Westfield, Mass.
Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering Inc., Newark, N. J.
Trane Co., The, La Crosse, Wis.
Union Asbestos & Rubber Co., Chicago, Ill.
United States Radiator Corp., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.
Vulcan Radiator Co., Hartford, Conn.
Webster & Co., Warren, Camden, N. J.

RADIATOR AND CONVECTOR HUMIDIFIERS

See Humidifiers for Radiators and Convectors

RADIATOR HANGERS

See Hangers or Brackets, Radiator

RADIATOR ORIFICES

See Orifices, Radiator

RADIATOR ORIFICE VALVES

See Valves, Radiator, Orifice

RADIATOR VALVES

See Valves, Radiator

RADIATOR VENT VALVE HUMIDIFIERS

See Humidifiers, Radiator Vent Valve

RADIATORS, ELECTRIC

Burnham Corp., Boiler Div., Irvington, N. Y.
Conco Engineering Wks., Div. of H. D. Conkey & Co., Mendota, Ill.
Meco, Inc., Portland, Ore.
Trent, Inc., Philadelphia, Pa.
Wesix Electric Heater Co., San Francisco, Calif.

RADIATORS, GAS FIRED

Clow & Sons, James B., Chicago, Ill.

RADIATORS, HUMIDIFYING

Murray Mfg. Co., D. J., Wausau, Wis.

RAMS, WATER, FOR CLEANING OUT PIPE LINES

Hydraulic Mfg. Co., Kiel, Wis.

RATCHET WRENCHES

See Wrenches, Ratchet

REAMERS, PIPE

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Beaver Pipe Tools, Inc., Warren, O.
Capewell Mfg. Co., Hartford, Conn.
Crown Die & Tool Co., Chicago, Ill.
Greenfield Tap & Die Corp., Greenfield, Mass.
Mueller Co., Decatur, Ill.
Nye Tool Co., Chicago, Ill.
Reed Mfg. Co., Erie, Pa.
Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Thor Power Tool Co., Aurora, Ill.
Toledo Pipe Threading Machine Co., Toledo, O.

RECIPROCATING PUMPS

See Pumps, Reciprocating

RECORDER-CONTROLLERS, COMBINED TEMPERATURE AND HUMIDITY

American Instrument Co., Inc., Silver Spring, Md.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Scientific Instrument Co., Detroit, Mich.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Weston Electrical Instrument Corp., Newark, N. J.

RECORDER-CONTROLLERS, HUMIDITY

American Instrument Co., Inc., Silver Spring, Md.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Garden City Instruments, Inc., Chicago, Ill.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Scientific Instrument Co., Detroit, Mich.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., New York, N. Y.
Weston Electical Instrument Corp., Newark, N. J.

RECORDER-CONTROLLERS, PRESSURE

Automatic Control Co., St. Paul, Minn.
Bailey Meter Co., Cleveland, O.
Baldwin-Lima-Hamilton Corp., Philadelphia, Pa.
Bristol Co., The, Waterbury, Conn.

Defender Instrument and Regulator Co., St. Louis, Mo.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Garden City Instruments, Inc., Chicago, Ill.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Mason-Neilan Regulator Co., Boston, Mass.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Moore Products Co., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Scientific Instrument Co., Detroit, Mich.
Shallcross Controls, Inc., Milwaukee, Wis.
Swartwout Co., The, Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.

RECORDER-CONTROLLERS, TEMPERATURE

American Instrument Co., Inc., Silver Spring, Md.
Bailey Meter Co., Cleveland, O.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dickson Co., The, Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Garden City Instruments, Inc., Chicago, Ill.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
Hagan Corp., Pittsburgh, Pa.
Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Mason-Neilan Regulator Co., Boston, Mass.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Moore Products Co., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
Scientific Instrument Co., Detroit, Mich.
Shallcross Controls, Inc., Milwaukee, Wis.
Swartwout Co., The, Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.
Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.

RECORDERS, CARBON DIOXIDE

Cole-Sewell Engineering Co., St. Paul, Minn.
Davis Instruments, Div. of Davis Emergency Equipment Co., Inc., Newark, N. J.
Defender Instrument and Regulator Co., St. Louis, Mo.
Engelhard, Inc., Charles, Newark, N. J.
Hays Corp., Michigan City, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia, Pa.
Permutit Co., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
Victory Engineering Corp., Union, N. J.

RECORDERS, COMBINED TEMPERATURE AND HUMIDITY

American Instrument Co., Inc., Silver Spring, Md.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Garden City Instruments Inc., Chicago, Ill.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Powers Regulator Co., Skokie, Ill.
Scientific Instrument Co., Detroit, Mich.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.

RECORDERS, DEW POINT

American Instrument Co., Inc., Silver Spring, Md.
Bristol Co., The, Waterbury, Conn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Surface Combustion Corp., Toledo, O.

RECORDERS, DRAFT

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Defender Instrument and Regulator Co., St. Louis, Mo.
Foxboro Co., Foxboro, Mass.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
Victory Engineering Corp., Union, N. J.

RECORDERS, HUMIDITY

American Instrument Co., Inc., Silver Spring, Md.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Garden City Instruments, Inc., Chicago, Ill.
Leeds & Northrup Co., Philadelphia, Pa.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Powers Regulator Co., Skokie, Ill.
Scientific Instrument Co., Detroit, Mich.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.

RECORDERS, LIQUID LEVEL

Automatic Control Co., St. Paul, Minn.
Bailey Meter Co., Cleveland, O.
Barton Instrument Corp., Los Angeles, Calif.
Bristol Co., The, Waterbury, Conn.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Defender Instrument & Regulator Co., St. Louis, Mo.
Fielden Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Healy Ruff Co., St. Paul, Minn.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Liquidometer Corp., Long Island City, N. Y.
Mason-Neilan Regulator Co., Boston, Mass.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Moore Products Co., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Taylor Instrument Companies, Rochester, N. Y.
Uehling Instrument Co., Paterson, N. J.
Westinghouse Electric Corp., Pittsburgh, Pa.
Yarnall-Waring Co., Philadelphia, Pa.

RECORDERS, OXYGEN

Bailey Meter Co., Cleveland, O.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Mine Safety Appliances Co., Pittsburgh, Pa.
Victory Engineering Corp., Union, N. J.

RECORDERS, PRESSURE AND VACUUM

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Baldwin-Lima-Hamilton Corp., Philadelphia, Pa.
Bristol Co., The, Waterbury, Conn.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dickson Co., The, Chicago, Ill.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Garden City Instruments, Inc., Chicago, Ill.
Giannini & Co., Inc., Pasadena, Calif.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
Hagan Corp., Pittsburgh, Pa.
Hastings Instrument Co., Inc., Hampton, Va.
Hays Corp., Michigan City, Ind.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Mason-Neilan Regulator Co., Boston, Mass.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Republic Flow Meters Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Stokes Machine Co., F. J., Philadelphia, Pa.
Swartwout Co., The, Cleveland, Ohio
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Uehling Instrument Co., Paterson, N. J.

Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.

RECORDERS, SMOKE DENSITY

Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Combustion Control Corp., Boston, Mass.
De-Tec-Tronic Laboratories, Inc., Chicago, Ill.
Edwards, L. V., Rockville Center, N. Y.
Ess Instrument Co., Bergenfield, N. J.
General Power Plant Corp., Ossining, N. Y.
Leeds & Northrup Co., Philadelphia, Pa.
Sterns-Flinn Corp., New York, N. Y.

RECORDERS, TEMPERATURE

American Instrument Co., Inc., Silver Spring, Md.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Barber-Colman Co., Rockford, Ill.
Beckman & Whitley, Inc., San Carlos, Calif.
Bristol Co., The, Waterbury, Conn.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dickson Co., The, Chicago, Ill.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Engelhard, Inc., Charles, Newark, N. J.
Fielden Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
G. M. Mfg. Co., New York, N. Y.
Garden City Instruments, Inc., Chicago, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Gotham Instrument Co., Div., American Machine & Metals, Inc. Philadelphia, Pa.
H-B Instrument Co., Philadelphia, Pa.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Mason-Neilan Regulator Co., Boston, Mass.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Moore Products Co., Philadelphia, Pa.
Palmer Thermometers, Inc., Cincinnati (Norwood), O. (Mercury-actuated)
Penn Industrial Instrument Corp., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
Republic Flow Meters Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
Victory Engineering Corp., Union, N. J.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.
Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.

RECORDING THERMOMETERS

See Recorders, Temperature

RECOVERY EQUIPMENT, AIR

See Adsorbers, Odor

REDUCERS, SPEED

Abart Gear & Machine Co., Chicago, Ill.
Adams Co., The, Dubuque, Iowa
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Bodine Electric Co., Chicago, Ill.
Boston Gear Wks., Quincy, Mass.
Brown-Brockmeyer Co., Inc., Dayton, O.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Cleveland Worm & Gear Co., Cleveland, O.
De Laval Steam Turbine Co., Trenton, N. J.
DoAll Co., The, Des Plaines, Ill.
Dodge Mfg. Corp., Mishawaka, Ind.
Falk Corp., Milwaukee, Wis.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Graham Transmissions, Inc., Menomonee Falls, Wis.
Janette Electric Mfg. Co., Morton Grove, Ill.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Lima Electric Motor Co., The, Lima, O.
Link Belt Co., Philadelphia, Pa.
Medart Co., St. Louis, Mo.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Poole Foundry & Machine Co., Baltimore, Md.
Reliance Electric & Engineering Co., Cleveland, O.
Shallcross Controls, Inc., Milwaukee, Wis.
Star-Kimble Motor Div., Miehle Prntg. Press & Mfg. Co., Bloomfield, N. J.
Steam Turbine Div., Worthington Pump & Machinery Corp., Wellsville, N. Y.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Sterling Electric Motors, Inc., Los Angeles, Calif.
U. S. Electrical Motors, Inc., Los Angeles, Calif.
Westinghouse Electric Corp., Pittsburgh, Pa.

REFRACTORIES AND REFRACTORY CEMENT

Allen Co., Robert G., Mechanicsville, N. Y.
Armstrong Cork Co., Lancaster, Pa.
Babcock & Wilcox Co., New York, N. Y.
Basic Refractories, Inc., Cleveland, O.
Botfield Refractories Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Chicago Fire Brick Co., Chicago, Ill.
Elraco Engineering Co., Los Angeles, Calif.
Fireline Stove & Furnace Lining Co., Chicago, Ill.
General Insulating Products Co., Brooklyn, N. Y.
Green Fire Brick Co., Mexico, Mo.
Johns-Manville, New York, N. Y.
Krehbiel Co., J. H., Chicago, Ill.
Laclede-Christy Co., St. Louis, Mo.
Monogram Products Co., Inc., Philadelphia, Pa.
Nebel Mfg. Co., Cleveland, O.
Norton Co., Worcester, Mass.
Plibrico Co., Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Ramtite Co., The, Chicago, Ill.
Refractory & Insulation Corp., New York, N. Y.
Reintjes Co., Geo. P., Kansas City, Mo.
Rex Clay Products Co., Detroit, Mich.
Rutland Fire Clay Co., Rutland, Vt.
S.O.S. Products Co., Inc., Brooklyn, N. Y.
Saverite Engineering Co., Hoboken, N. J.
Standard Fuel Engineering Co., Detroit, Mich.
Taylor Sons Co., Charles, Cincinnati, O.
United States Stoneware Co., New York, N. Y.
Walsh Refractories Corp., St. Louis, Mo.
Zonolite Co., Chicago, Ill.

REFRIGERANT DEHYDRATORS

See Dehydrators, Refrigerant

REFRIGERANT FILTERS

See Filters, Refrigerant

REFRIGERANT GAS PURGERS

See Purgers, Refrigerant Gas

REFRIGERANTS

Ansul Chemical Co., Refrigeration Div. Marinette, Wis. (methyl chloride, sulphur dioxide)
Armour and Co., Ammonia Div., Chicago, Ill. (ammonia)
Dow Chemical Co., The, Midland, Mich.
du Pont de Nemours & Co., Inc., E. I. Polychemicals Dept., Wilmington, Del. (National anhydrous ammonia)
du Pont de Nemours & Co., Inc., E. I., Kinetic Chemicals Div., Wilmington, Del. ("Freon" fluorinated hydro carbon refrigerants)
du Pont de Nemours & Co., Inc., E. I., Electrochemicals Dept., Wilmington, Del. (Methyl chloride and methylene chloride)
Eston Chemicals, Div. American Potash & Chemical Corp., Los Angeles, Calif. (sulfur dioxide methyl chloride)
General Chemicals Div., Allied Chemical & Dye Corp., New York, N. Y. (trichloromonofluromethane and dichlorodifluromethane)
Liquid Carbonic Corp., Chicago, Ill. (carbon dioxide)
Monsanto Chemical Co., Merimac Div., Boston, Mass. (anhydrous ammonia)
Pennsylvania Salt Mfg. Co., Philadelphia, Pa. (ammonia)
Pure Carbonic, Inc., Div. of Air Reduction Co., Inc., New York, N. Y. (carbon dioxide)
Solvay Process Div., Allied Chemical & Dye Corp., New York, N. Y.
Virginia Smelting Co., West Norfolk, Va., (Methyl chloride, liquid sulphur dioxide, methylene chloride)

REFRIGERATING COMPRESSORS

See Compressors, Refrigerating

REFRIGERATION ACCUMULATORS

See Accumulators, Refrigeration

REFRIGERATION CONTROLS

See Valves, Refrigeration

REFRIGERATION FITTINGS

See Fittings, Refrigeration

REFRIGERATION MANIFOLDS

See Manifolds, Refrigeration

REFRIGERATION VALVES

See Valves, Refrigeration

REGISTERS

See also Diffusers; Grilles; Panels, Perforated, for Air Diffusion

A. & A. Register Co., Cleveland, O.
A-J Mfg. Co., Kansas City, Mo.

Air Control Products, Inc., Coopersville, Mich.
Air-Factors, Inc., Monrovia, Calif.
Auer Register Co., Cleveland, O.
Barber-Colman Co., Rockford, Ill.
Best Register Co., Milwaukee, Wis.
Char-Gale Mfg. Co., Minneapolis, Minn.
Controlair Mfg. Co., Los Angeles, Calif.
Diamond Mfg. Co., Wyoming, Pa.
Dole Valve Co., The, Chicago, Ill. (Automatic register)
Don Mfg. Co., Chicago, Ill.
Empire Ventilation Equipment Co., Long Island City, N. Y.
General Electric Co., Air Conditioning Div., Bloomfield, N. J.
Harrington & King Perforating Co., Chicago, Ill.
Hart & Cooley Mfg. Co., Holland, Mich.
Hastings Air Conditioning Co., Hastings, Neb.
Hendrick Mfg. Co., Carbondale, Pa.
Independent Register Co., Cleveland, O.
Knowles Mushroom Ventilator Co., Upper Montclair, N. J.
Krueger Air Conditioning Co., Tucson, Ariz.
Lima Register Co., The, Lima, O.
Louvra Corp., The, Union, N. J.
Martin Metal Products Corp., Ferndale, Mich.
Midco Register Corp., St. Paul, Minn.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Patco Mfg. Co., Philadelphia, Pa.
Pennant Corp., Grand Rapids, Mich.
Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Rock Island Register Co., Rock Island, Ill.
Smith Co., J. B., Philadelphia, Pa.
Standard Stamping & Perforating Co., Chicago, Ill.
Stewart Mfg. Co., Inc., Cedar Grove, N. J.
Thermo-Base Div., Gerwin Industries, Michigan City, Ind.
Titus Mfg. Corp., Waterloo, Ia.
Tuttle & Bailey, Inc., New Britain, Conn.
United States Register Co., Battle Creek, Mich.
Viking Mfg. Corp., Cleveland, O.
Waterloo Register Co., Waterloo, Ia.
Young Regulator Co., Cleveland, O.

REGISTER UNITS, FOR SECONDARY AIR SUPPLY FOR OIL BURNERS

Faber Engineering Co., Philadelphia, Pa.
Radiant Combustion System, Inc., New York, N. Y.

REGULATORS, AIR VELOCITY

Barber-Colman Co., Rockford, Ill.
Hastings Instrument Co., Inc., Hampton, Va.
Hays Corp., Michigan City, Ind.
Johnson Service Co., Milwaukee, Wis.
Shallcross Controls, Inc., Milwaukee, Wis.
Taylor Instrument Companies, Rochester, N. Y.

REGULATORS, DAMPER SETS

Acme Mfg. Co., Philadelphia, Pa.
Acro Mfg. Co., The, Columbus, O.
Adams Co., The, Dubuque, Ia.
Ashcraft Co., J. P., Dallas, Tex.
Automatic Devices Co., Inc., Western Springs, Ill.
Barber-Colman Co., Rockford, Ill.
Crown Controls Co., Inc., New Bremen, O.
Detroit Controls Corp., Detroit, Mich.
Duro-Dyne Corp., Hempstead, L. I., N. Y.
Field Control Div., H. D. Conkey & Co., Mendota, Ill.
Fossum, M. H., St. Paul, Minn.
General Controls Co., Glendale, Calif. and Skokie, Ill.
Gerett Corp., M. A., Milwaukee, Wis.
Hart & Cooley Mfg. Co., Holland, Mich.
Kerentoff, G. L., Cincinnati, O.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Parker-Kalon Div., General American Transportation Corp., New York, N. Y.
Penn Controls, Inc., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Powers Regulator Co., Skokie, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Shallcross Controls, Inc., Milwaukee, Wis.
Soreng Products Corp., Schiller Park, Ill.
Trane Co., The, LaCrosse, Wis.
United States Register Co., Battle Creek, Mich.
Wa-Trol, Houston, Tex.
Young Regulator Co., Cleveland, O.

REGULATORS, DRAFT, COMBUSTION

Askania Regulator Co., Chicago, Ill.
Automatic Devices Co., Inc., Western Springs, Ill.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Canton Stoker Corp., Canton, O.
Cash Co., A. W., Decatur, Ill.
Cleveland Fuel Equipment Co., Cleveland, O.
Cole-Sewell Engineering Co., St. Paul, Minn.
Combustion Equipment Co., Silvis, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
Engineer Co., New York, N. Y.
Engineered Products Co., Philadelphia, Pa.
Field Control Div., H. D. Conkey & Co., Mendota, Ill.
Foster Wheeler Corp., New York, N. Y.
Foxboro Co., Foxboro, Mass.
Fuel Reduction Corp., Chicago, Ill.
Fuelguard Co., Dallas, Tex.
General Blower Co., Inc., Philadelphia, Pa.
General Power Plant Corp., Ossining, N. Y.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Kol-Master Corp., Oregon, Ill.
Krueger Sentry Gauge Co., Green Bay, Wis.
Leahy Mfg. Co., Los Angeles, Calif.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Regulator Co., Boston, Mass.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Perfex Corp., Milwaukee, Wis.
Preferred Utilities Mfg. Corp., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill. (Industrial)
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Simplex Mfg. Co., Fond du Lac, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Webster Engineering Co., Tulsa, Okla.

REGULATORS, FLUID FLOW, FOR CONSTANT VOLUME

Independent of Pressure

A-P Controls Corp., Milwaukee, Wis.
Askania Regulator Co., Chicago, Ill.
Bailey Co., Chas. M., San Francisco, Calif.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Bristol Co., The, Waterbury, Conn.
Cla-Val Co., Alhambra, Calif.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Hays Corp., Michigan City, Ind.
Kates Co., W. A., The, Deerfield, Ill.
Klipfel Valves, Inc., Hamilton, O.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Taco Heaters, Inc., Providence, R. I.

REGULATORS, LEVEL, LIQUID

Alco Valve Co., St. Louis, Mo.
Askania Regulator Co., Chicago, Ill.
Associated Valve & Engineering Co., Chicago, Ill.
Automatic Control Co., St. Paul, Minn.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Barber-Colman Co., Rockford, Ill.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Boylston Steam Specialty Co., Chicago, Ill.
Bristol Co., The, Waterbury, Conn.
Burrows Mfg. Co., F. A. York, Pa.
Cla-Val Co., Alhambra, Calif.
Cooper Co., Clark, Palmyra, N. J.
Copes-Vulcan Div., Continental Foundry & Machine Co., Erie, Pa.
Coral Designs Div. of Henry G. Dietz Co., Long Island City, N. Y.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis Regulator Co., Chicago, Ill.
Defender Instrument & Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fischer & Porter Co., Hatboro, Pa.
Fisher Governor Co., Marshalltown, Ia.
Foxboro Co., Foxboro, Mass.
Golden-Anderson Specialty Co., Pittsburgh, Pa.
Griscom-Russell Co., The, Massillon, O.
Grove Regulator Co., Oakland, Calif.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Instruments, Inc., Tulsa, Okla.
Johnson Corp., The, Three Rivers, Mich.
Johnson Service Co., Milwaukee, Wis.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., Middletown, N. Y.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Klipfel Valves, Inc., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Magnetrol, Inc., Chicago, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Newark Controls Co., Bloomfield, N. J.
Penn Controls, Inc., Goshen, Ind.
Penn Industrial Instrument Corp., Philadelphia, Pa.

Sarco Co., Inc., New York, N. Y.
Smith Co., S. Morgan, York, Pa.
Spence Engineering Co., Inc., Walden, N. Y.
Sporlan Valve Co., St. Louis, Mo.
Swartwout Co., The, Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.
Thermo Instruments Co., Belmont, Calif.
Trimount Instrument Co., Chicago, Ill.
United Electric Controls Co., Watertown, Mass.
Weston Electrical Instrument Corp., Newark, N. J.

REGULATORS, PRESSURE, AIR

Air Conversion Research Corp., Chicago, Ill.
American Meter Co., Inc., Philadelphia, Pa.
Askania Regulator Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Barber-Colman Co., Rockford, Ill.
Binks Mfg. Co., Chicago, Ill.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Boylston Steam Specialty Co., Chicago, Ill.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Burrows Mfg. Co., F. A., York, Pa.
CCA Products, Inc., Glendale, Calif.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Clark Mfg. Co., Cleveland, O.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
DeVilbiss Co., The, Toledo, O.
Dockson Corp., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Electric Sprayit Co., The, Sheboygan, Wis.
Fischer & Porter Co., Hatboro, Pa.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Foxboro Co., Foxboro, Mass.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
Greiner Co., Emil, New York, N. Y.
Grove Regulator Co., Oakland, Calif.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Hubbell Corp., Mundelein, Ill.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Keller Tool Co., Grand Haven, Mich.
Kieley & Mueller, Inc., Middletown, N. Y.
Klipfel Valves, Inc., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Mason-Nielan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Modern Engineering Co., St. Louis, Mo.
Monitor Controller Co., The, Boston, Mass.
Moore Products Co., Philadelphia, Pa.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
National Cylinder Gas Co., Chicago, Ill.
Norgren Co., C. A., Englewood, Colo.
North Penn Co., New York, N. Y.
Norwalk Valve Co., Norwalk, Conn.
Paasche Airbrush Co., Chicago, Ill.
Penn Controls, Inc., Goshen, Ind.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Rockwell Mfg. Co., Meter and Valve Div., Pittsburgh, Pa.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Smith Co., S. Morgan, York, Pa.
Spence Engineering Co., Inc., Walden, N. Y.
Spray Engineering Co., Somerville, Mass.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Squires Co., C. E., The Cleveland, O.
Strong, Carlisle & Hammond Co., Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Tryco Products, Inc., Westfield, Mass.
United Electric Controls Co., Watertown, Mass.
Warren Engineering Co., Broadway, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Weston Electrical Instrument Corp., Newark, N. J.

REGULATORS, PRESSURE, GAS

American District Steam Co., Inc., North Tonawanda, N. Y.
American Meter Co., Inc., Philadelphia, Pa.
Askania Regulator Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Barber-Colman Co., Rockford, Ill.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Boylston Steam Specialty Co., Chicago, Ill.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Clark Mfg. Co., Cleveland, O.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Dockson Corp., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Foxboro Co., Foxboro, Mass.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
General Controls Co., Glendale, Calif. and Skokie, Ill.
Greiner Co., Emil, New York, N. Y.
Grove Regulator Co., Oakland, Calif.
Hagan Corp., Pittsburgh, Pa.
Harris Calorific Co., The, Cleveland, O.
Hays Corp., Michigan City, Ind.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Hubbell Corp., Mundelein, Ill.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Industrial Gas Div., Liquid Carbonic Corp., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., Middletown, N. Y.
Klipfel Valves, Inc., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Linde Air Products Co., A Div. of Union Carbide & Carbon Corp., New York, N. Y.
Liquid Carbonic Corp., The, Chicago, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
Maxitrol Co., Detroit, Mich.
McAlear Mfg. Co., Chicago, Ill.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Modern Engineering Co., St. Louis, Mo.
Monitor Controller Co., The, Boston, Mass.
Moore Products Co., Philadelphia, Pa.
Mueller Co., Decatur, Ill.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
National Cylinder Gas Co., Chicago, Ill.
Norgren Co., C. A., Englewood, Colo.
North American Mfg. Co., Cleveland, O.
Norwalk Valve Co., South Norwalk, Conn.
Penn Controls, Inc., Goshen, Ind.
Positive Control Co., The, Cincinnati, O.
Republic Flow Meters Co., Chicago, Ill. (Industrial)
Rockwell Mfg. Co., Meter and Valve Div., Pittsburgh, Pa.
Ruggles Klingemann Mfg. Co., Boston, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Smith Co., S. Morgan, York, Pa.
Spence Engineering Co., Inc., Walden, N. Y.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Squires Co., C. E., The, Cleveland, O.
Staples & Pfeiffer, San Francisco, Calif.
Strong, Carlisle & Hammond Co., Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.
Thermac Co., Los Angeles, Calif.
Trerice Co., H. O., Detroit, Mich.
United Electric Controls Co., Watertown, Mass.
Universal Controls Corp., Dallas, Tex.
Warren Engineering Co., Broadway, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Weston Electrical Instrument Corp., Newark, N. J.

REGULATORS, PRESSURE, HOT WATER HEATING SYSTEMS

Bailey Co., Chas., M., San Francisco, Calif.
Barber-Colman Co., Rockford, Ill.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Bell & Gossett Co., Morton Grove, Ill.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Burrows Mfg. Co., F. A., York, Pa.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Chicago Specialty Mfg. Co., Chicago, Ill.
Clark Mfg. Co., Cleveland, O.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Detroit Controls Corp., Detroit, Mich.

Fisher Governor Co., Marshalltown, Ia.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Kainer and Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Klipfel Valves, Inc., Hamilton, O.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Mercoid Corp., The, Chicago, Ill.
Mueller Co., Decatur, Ill.
Penn Controls, Inc., Goshen, Ind.
Powers Regulator Co., Skokie, Ill.
Sall Bros. Co., Rockford, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Squires Co., C. E., The, Cleveland, O.
Taco Heaters, Inc., Providence, R. I.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, LaCrosse, Wis.
Watts Regulator Co., Lawrence, Mass.
White-Rodgers Electric Co., St. Louis, Mo.
Yula Water Heaters Inc., New York, N. Y.

REGULATORS, PRESSURE, LIQUID

Askania Regulator Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Automatic Control Co., St. Paul, Minn.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Barber-Colman Co., Rockford, Ill.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Boylston Steam Specialty Co., Chicago, Ill.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Clark Controller Co., Cleveland, O.
Cla-Val Co., Alhambra, Calif.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Eddington Metal Specialty Co., Eddington, Pa.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Foxboro Co., Foxboro, Mass.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Healy Ruff Co., St. Paul, Minn.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Hubbell Corp., Mundelein, Ill.
Johnson Service Co., Milwaukee, Wis.
Justus Steam Trap Co., Napanoch, N. Y.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., Middletown, N. Y.
Klipfel Valves, Inc., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Monarch Mfg. Wks., Inc., Philadelphia, Pa.
Monitor Controller Co., The, Boston, Mass.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Newark Controls Co., Bloomfield, N. J.
Norgren Co., C. A., Englewood, Colo.
Penn Controls, Inc., Goshen, Ind.
Powers Regulator Co., Skokie, Ill.
Republic Flow Meters Co., Chicago, Ill.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Smith Co., S. Morgan, York, Pa.
Spence Engineering Co., Inc., Walden, N. Y.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Squires Co., C. E., The, Cleveland, O.
Staples & Pfeiffer, San Francisco, Calif.
Stickle Steam Specialties Co., Indianapolis, Ind.
Strong, Carlisle & Hammond Co., Cleveland, O.
Swartwout Co., The, Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Tryco Products, Inc., Westfield, Mass.
United Electric Controls Co., Watertown, Mass.
Warren Engineering Co., Broadway, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Weston Electrical Instrument Corp., Newark, N. J.
Watts Regulator Co., Lawrence, Mass.
White-Rodgers Electric Co., St. Louis, Mo.
Williams Gauge Co., The, Pittsburgh, Pa. (Feed water)

REGULATORS, STATIC PRESSURE, AIR DUCT

Bailey Co., Chas. M., San Francisco, Calif.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Cash Co., A. W., Decatur, Ill.
Cooper Co., Clark, Palmyra, N. J.
Coral Designs Div. of Henry G. Dietz Co., Long Island City, N. Y.
Hays Corp., Michigan City, Ind.
Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Shallcross Controls, Inc., Milwaukee, Wis.

REGULATORS, TEMPERATURE

A-P Controls Corp., Milwaukee, Wis.
Acro Mfg. Co., The, Columbus, O.
Aerco Corp., Englewood, N. J.
American Instrument Co., Inc., Silver Spring, Md.
Atlas Valve Co., Newark, N. J.
Au-Temp-Co Corp., New York, N. Y.
Automatic Devices Co., Inc., Western Springs, Ill.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Barber-Colman Co., Rockford, Ill.
Bell & Gossett Co., Morton Grove, Ill.
Bristol Co., The, Waterbury, Conn.
Burling Instrument Co., South Orange, N. J.
Cooper Co., Clark, Palmyra, N. J.
Crown Controls Co., Inc., New Bremen, O.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Detroit Controls Corp., Detroit, Mich.
Eastern Industries, Inc., New Haven, Conn.
Eclipse Fuel Engineering Co., Rockford, Ill.
Farris Stacon Corp., Palisades Park, N. J.
Fenwal Inc., Ashland, Mass.
Foster Engineering Co., Union, N. J.
Foxboro Co., Foxboro, Mass.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
General Controls Co., Glendale, Calif. and Skokie, Ill.
Gleason-Avery, Inc., Auburn, N. Y.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Heat Timer Corp., New York, N. Y.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Keckley Co., O. C., Chicago, Ill.
Klipfel Valves, Inc., Hamilton, O.
Lawler Automatic Controls, Inc., Mount Vernon, N. Y.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
McAlear Mfg. Co., Chicago, Ill.
McCorkle Co., D. H., Berkeley, Calif.
McDonnell & Millers, Inc., Chicago, Ill.
Mercoid Corp., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Penn Controls, Inc., Goshen, Ind.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Perfex Corp., Milwaukee, Wis.
Philadelphia Thermometer Co., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Scaico, Inc., Palmyra, N. J.
Scientific Instrument Co., Detroit, Mich.
Smith Co., S. Morgan, York, Pa.
Spence Engineering Co., Inc., Walden, N. Y.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Squires Co., C. E., The, Cleveland, O.
Sterling, Inc., Milwaukee, Wis.
Superior Controls Co., Inc., Los Angeles, Calif.
Swartwout Co., The, Cleveland, O.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Taylor Instrument Companies, Rochester, N. Y.
Thermac Co., Los Angeles, Calif.

Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Inc., Peru, Ind.
United Electric Controls Co., Watertown, Mass.
Warren Engineering Co., Broadway, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Weston Electrical Instrument Corp., Newark, N. J.
West Instrument Corp., Chicago, Ill.
Wheelco Instruments Co., Chicago, Ill.
White-Rodgers Electric Co., St. Louis, Mo.

RELAYS, ELECTRICAL

A'G'A Div. of Elastic Stop Nut Corp. of America, Elizabeth, N. J. (time delay)
Advance Electric and Relay Co., Burbank, Calif.
Allen-Bradley Co., Milwaukee, Wis.
Allied Control Co., Inc., New York, N. Y.
American Instrument Co., Inc., Silver Spring, Md.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
Au-Temp-Co Corp., New York, N. Y.
Automatic Electric Mfg. Co., Mankato, Minn.
Automatic Switch Co., Orange, N. J.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
B/W Controller Corp., Birmingham, Mich.
Barber-Colman Co., Rockford, Ill.
Benjamin Electric Mfg. Co., Des Plaines, Ill.
Clark Controller Co., Cleveland, O.
Consolidated Metal Products Corp., Albany, N. Y.
Cook Electric Co., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer Inc., Milwaukee, Wis.
Detroit Controls Corp., Detroit, Mich.
Durakool, Inc., Elkhart, Ind.
Edison, Inc., Thos. A., Instrument Div., West Orange, N. J.
Electro-Switch & Controls Inc., Culver City, Calif.
Ess Instrument Co., Bergenfield, N. J.
General Controls Co., Glendale, Calif. and Skokie, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
Hart Mfg. Co., The, Hartford, Conn.
H-B Instrument Co., Philadelphia, Pa.
Heinemann Electric Co., Trenton, N. J.
Industrial Engineering Corp., Terre Haute, Ind.
Leach Relay Co., Los Angeles, Calif.
McCorkle Co., D. H., Berkeley, Calif.
McQuay-Norris Mfg. Co., St. Louis, Mo.
Mercoid Corp., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Monitor Controller Co., The, Boston, Mass.
National Time & Signal Corp., Detroit, Mich.
Penn Controls, Inc., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Philadelphia Thermometer Co., Philadelphia, Pa.
Potter & Brumfield Sales Co., Princeton, Ind.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Smith Co., S. Morgan, York, Pa.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Square D Co., Detroit, Mich.
Struthers-Dunn, Inc., Philadelphia, Pa.
Synchro-Start Products, Inc., Skokie, Ill.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Thermo Instruments Co., Belmont, Calif.
Thrush & Co., H. A., Peru, Ind.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Vapor Heating Corp., Chicago, Ill.
Ward Leonard Electric Co., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.
Weston Electrical Instrument Corp., Newark, N. J.
Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.
White-Rodgers Electric Co., St. Louis, Mo.
Zenith Electric Co., Chicago, Ill.

RELAYS, PNEUMATIC

Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Hagan Corp., Pittsburgh, Pa.
Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moore Products Co., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.

RELIEF VALVES

See Valves, Relief

REPAIR CLAMPS

See Clamps, Pipe Repair

REPAIR PLUGS FOR TANKS

See Plugs, Repair, for Tanks

RESEATERS, VALVE

Chicago Specialty Mfg. Co., Chicago, Ill.
Economy Valve Seat Co., Chicago, Ill.
Leavitt Machine Co., Orange, Mass.
Skinner Co., M. B., South Bend, Ind.
Standard Reseater Corp., New York, N. Y.
Thor Power Tool Co., Aurora, Ill.

REVERSE REFRIGERATION CYCLE UNITS

See Units, Air Conditioning, Reverse Refrigeration Cycle

RINGS, PISTON, FOR COMPRESSORS

Delavan Mfg. Co., West Des Moines, Ia.
Double Seal Ring Co., Fort Worth, Tex.
Koppers Co., Inc., Metal Products Div., Baltimore, Md.
McQuay-Norris Mfg. Co., St. Louis, Mo.
Perfect Circle Corp., Hagerstown, Md.
Piston Ring Div., Koppers Co., Inc., Baltimore, Md.
Sealed Power Corp., Muskegon, Mich.

RINGS, WELDING

All-State Welding Alloys Co., Inc., White Plains, N. Y.
Grinnell Co., Inc., Providence, R. I.
Midwest Piping Co., Inc., St. Louis, Mo.
Robvon Backing Ring Co., Elizabeth, N. J.
Tube Turns, Inc., Louisville, Ky.
Wedge Protectors, Inc., Cleveland, O.
Wickwire Spencer Steel, Div., of Colorado Fuel & Iron Corp., New York, N. Y.

ROD, GAS WELDING

Air Reduction Sales Co., New York, N. Y.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Allied Weld-Craft, Inc., Indianapolis, Ind.
Alloy Rods Co., York, Pa.
Aluminum Co. of America, Pittsburgh, Pa.
American Brass Co., Waterbury, Conn.
American Steel & Wire Div., United States Steel, Cleveland, O.
Atlantic Steel Co., Atlanta, Ga.
Bridgeport Brass Co., Bridgeport, Conn.
Chemalloy Associates, Santee, Calif.
Crucible Steel Co. of America, Pittsburgh, Pa.
Dow Chemical Co., The, Midland, Mich.
Duraloy Co., Scottdale, Pa. (Stainless)
Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
International Nickel Co., Inc., The, New York, N. Y.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Marquette Mfg. Co., Minneapolis, Minn.
Maurath, Inc., Cleveland, O.
Mir-O-Col Alloy Co., Los Angeles, Calif. (for hard facing)
Modern Engineering Co., St. Louis, Mo.
National Cylinder Gas Co., Chicago, Ill.
Page Steel & Wire Division of American Chain & Cable Co., Inc., Monessen, Pa.
Revere Copper and Brass, Incorporated, New York, N. Y.
Victor Equipment Co., Welding Equipment Div., San Francisco, Calif.
Youngstown Sheet & Tube Co., Youngstown, O.

ROLLER BEARINGS

See Bearings, Roller

ROOF COOLERS

See Systems, Roof Spraying

ROOF SPRAYING SYSTEMS

See Systems, Roof Spraying

ROOF VENTILATORS

See Ventilators, Roof

ROOM HUMIDIFIERS

See Humidifiers, Unit, Room Type; and Units, Air Conditioning, Winter

ROOM THERMOSTATS

See Thermostats, Room or Wall

ROTARY PUMPS

See Pumps, Rotary

RUBBER BELTING

See Belting, Flat, Rubber

RUBBER PACKING

See Packing, Rubber and Synthetic

RUBBER PIPE

See Pipe, Hard Rubber

SADDLE VALVES

See Valves, Saddle

SADDLE TEES

See Fittings, Pipe, Saddle Tee

SAFETY VALVES

See Valves, Safety, Steam

SCAFFOLDS, PORTABLE

American Ladder & Scaffold Co., Miami, Fla.
Beaver Art Metal Corp., Ellwood City, Pa.
Up-Right Scaffolds, Berkeley, Calif.
Waco Steel Scaffolding, Inc., Waco, Tex.

SCALE CONTROL

See Devices, Electrolytic; Treatment, Steam System; Treatment, Water

SCALE REMOVAL, CHEMICAL SERVICE FOR

Anderson-Stolz Corp., Kansas City, Mo.
Aqua Electric Scale Control, Inc., Cleveland, O. (electric scale control)
Brown Electro Co., Oklahoma City, Okla. (electrolytic protector)
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Dearborn Chemical Co., Chicago, Ill.
Dowell Inc., Tulsa, Okla.
Evis Mfg. Co., San Francisco, Calif. (without chemicals)
Madden Corp., The, Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.
Oakite Products, Inc., New York, N. Y.
O'Brien Industries, Caldwell, N. J.

SCOOPS, AIR, FOR DEFLECTING FLOW IN DUCTS

Stewart Mfg. Co., Inc., Cedar Grove, N. J.
Titus Mfg. Corp., Waterloo, Ia.
Waterloo Register Co., Inc., Waterloo, Ia.

SCREENS, SUN REFLECTING

Ingersoll Products Div., Borg-Warner Corp., Chicago, Ill.
Kaiser Aluminum & Chemical Corp., Oakland, Calif.
Kane Mfg. Corp., Kane, Pa.

SCREWS, SHEET METAL

Aluminum Co. of America, Pittsburgh, Pa.
American Screw Co., Willimantic, Conn.
Continental Screw Co., New Bedford, Mass.
Elco Tool & Screw Corp., Rockford, Ill.
Harper Co., H. M., Morton Grove, Ill.
Industrial Screw Co., Chicago, Ill.
Lamson & Sessions Co., Cleveland, O.
National Lock Co., Inc., Rockford, Ill.
Paine Co., Addison, Ill.
Parker-Kalon Div., General American Transportation Corp., New York, N. Y.
Pheoll Mfg. Co., Chicago, Ill.
Rockford Screw Products Co., Rockford, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Mfg. Co., Waterville Div., Waterville, Conn.
Shakeproof Div., Illinois Tool Wks., Elgin, Ill.
Standard Pressed Steel Co., Jenkintown, Pa.
Star Stainless Screw Co., Paterson, N. J.
United States Register Co., Battle Creek, Mich.

SEALS, SHAFT, MECHANICAL

Crane Packing Co., Chicago, Ill.
Delavan Mfg. Co., West Des Moines, Ia.
Federal-Mogul Corp., Detroit, Mich.
Felt Products Mfg. Co., Chicago, Ill.
Garlock Packing Co., Palmyra, N. Y.
Johns-Manville, New York, N. Y.
Morganite, Inc., Carbon Specialties Div., Long Island City, N. Y.
Peerless Pump Div., Food Machinery and Chemical Corp., Los Angeles, Calif.
Rotary Seal Co., Chicago, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.
Sealol Corp., Providence, R. I.
Syntron Co., Homer City, Pa.

SEALS, TERMINAL, FOR COMPRESSORS

Delavan Mfg. Co., West Des Moines, Ia.
Wolfe Co., Inc., The, Franklin C., Culver City, Calif.

SEAMLESS PIPE

See Pipe, Steel, Seamless

SEPARATORS, AIR

Adams Co., Inc., R. P., Buffalo, N. Y.
Air Conversion Research Corp., Chicago, Ill.
Air-Line Engineering Co., Mansfield, Ohio
American District Steam Co., Inc., North Tonawanda, N. Y.
Anderson Co., V. D., The, Cleveland, O.
Armstrong Machine Works, Three Rivers, Mich.
Automatic Switch Co., Orange, N. J.
Binks Mfg. Co., Chicago, Ill.
Bowser, Inc., Fort Wayne, Ind.
Centrifix Corp., Cleveland, O.
Clark Mfg. Co., Cleveland, O.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
DeVilbiss Co., The, Toledo, O.
Dollinger Corp., Rochester, N. Y.
Dunham Co., C. A., Chicago, Ill.
Electric Sprayit Co., The, Sheboygan, Wis.
Gasflux Co., Mansfield, O.
Hagan Corp., Pittsburgh, Pa.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Johnson Corp., Three Rivers, Mich.
Kaye & MacDonald, Inc., West Orange, N. J.
Keckley Co., O. C., Chicago, Ill.
Kraissl Co., Inc., The, Hackensack, N. J.
Leavitt Machine Co., Orange, Mass.
Logan Engineering Co., Chicago, Ill.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Spencer Turbine Co., Hartford, Conn.
Spray Engineering Co., Somerville, Mass.
Strong,Carlisle & Hammond Co., Cleveland, O.
Swartwout Co., The, Cleveland, O.
Trane Co., The, La Crosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Wright-Austin Co., Detroit, Mich.

SEPARATORS, FLANGE

Kraissl Co., Inc., The, Hackensack, N. J.
Williams & Co., J. H., Buffalo, N. Y.

SEPARATORS, OIL

Acme Industries, Inc., Jackson, Mich.
Adams Co., Inc., R. P., Buffalo, N. Y.
Air Conversion Research Corp., Chicago, Ill.
American District Steam Co., Inc., North Tonawanda, N. Y.
Aminco Refrigeration Products Co., Detroit, Mich.
Anderson Co., V. D., The, Cleveland, O.
Armstrong Co., Richard M., Westchester, Pa.
Boylston Steam Specialty Co., Chicago, Ill.
Centrifix Corp., Cleveland, O. (Gas and Vapor)
Cochrane Corp., Philadelphia, Pa.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
Fisher Governor Co., Marshalltown, Ia.
Graver Water Conditioning Co., New York, N. Y.
Hagan Corp., Pittsburgh, Pa.
Hoppes Mfg. Co., Inc., Springfield, O.
Howe Ice Machine Co., Chicago, Ill.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Johnson Corp., The, Three Rivers, Mich.
Kaye & MacDonald, Inc., West Orange, N. J.
Kieley & Mueller, Inc., Middletown, N. Y.
Kraissl Co., Inc., The, Hackensack, N. J.
Morehead Mfg. Co., Detroit, Mich.
National Valve & Mfg. Co., Pittsburgh, Pa.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Richmond Engineering Co., Inc., Richmond, Va.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Sims Co., Erie, Pa.
Stickle Steam Specialties Co., Indianapolis, Ind.
Strong,Carlisle & Hammond Co., Cleveland, O.
Swartwout Co., The, Cleveland, O.
Temprite Products Corp., Birmingham, Mich.
Vilter Mfg. Co., The, Milwaukee, Wis.
Wabash Mfg. Co., Chicago, Ill.
Warner Lewis Co., Tulsa, Okla.
Webster & Co., Warren, Camden, N. J.
Wilson Engineeering Corp., Chicago, Ill.
Worthington Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
Wright-Austin Co., Detroit, Mich.

SETS, PIPE BIT, FOR BORING HOLES IN WOOD FOR PIPE AND TUBING

Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.

SEWAGE EJECTORS

See Ejectors, Sewage

SEWAGE PUMPS

See Pumps, Sewage

SHAFT SEALS, MECHANICAL

See Seals, Shaft, Mechanical

SHAFTS, FLEXIBLE, PUSH-PULL, FOR CONTROL

Arens Controls, Inc., Evanston, Ill.
Mall Tool Co., Chicago, Ill.
Piezo Mfg. Corp., New York, N. Y.
Stow Mfg. Co., Binghamton, N. Y.

SHEARS, ELECTRICAL, PORTABLE

Black & Decker Mfg. Co., Towson, Md.
G. D. S. Machinery & Supply Co., Inc., New York, N. Y.
M-M-A, Inc., Lancaster, Pa.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Skil Corp., Chicago, Ill.
Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.
Thor Power Tool Co., Aurora, Ill.

SHEARS, POWER

Barth Engineering & Mfg. Co., Inc., Milldale, Conn.
Bertsch & Co., Inc., Cambridge City, Ind.
Bliss Co., E. W., Detroit, Mich.
Buckeye Tools Corp., Dayton, O.
Buffalo Forge Co., Buffalo, N. Y.
Cincinnati Shaper Co., Cincinnati, O.
Cleveland Punch & Shear Works Co., Cleveland, O.
Diamond Machine Tool Co., Pico, Calif.
Dreis Co., Ltd., Edward J., San Carlos, Calif.
Excelsior Tool & Machine Co., East St. Louis, Ill.
Famco Machine Co., Kenosha, Wis.
Frederick Iron & Steel Inc., Frederick, Md.
H-A Mfg. Co., York, Pa.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore, Beloit, Wis.
Kling Bros. Engineering Works, Chicago, Ill.
Libert Machine Co., Green Bay, Wis.
Marshalltown Mfg. Co., Marshalltown, Ia.
Niagara Machine & Tool Wks., Buffalo, N. Y.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.
Quickwork Div., Whiting Corp., Harvey, Ill.
St. Louis Tool Co., St. Louis, Mo.
Stamco Inc., New Bremen, Ohio
Whiting Corp., Harvey, Ill.
Whitney Metal Tool Co., Rockford, Ill.
Wysong & Miles Inc., Greensboro, N. C.

SHEARS AND SNIPS, HAND

Bartlett Mfg. Co., Detroit, Mich.
Beverly Shear Mfg. Co., Chicago, Ill.
Black & Decker Mfg. Co., Towson, Md. (electrically driven)
Bremil Mfg. Co., Erie, Pa.
Champion Blower & Forge Co., Lancaster, Pa.
Crescent Tool Co., Jamestown, N. Y.
Excelsior Tool & Machine Co., East St. Louis, Ill.
G. D. S. Machinery & Supply Co., Inc., New York, N. Y.
Henkel-Clauss Co., The, Fremont, O.
Kidder Mfg. Co., Inc., J. F., Burlington, Vt. (Angle)
Klenk's Aviation Snips, Wilmington, Del.
McCoy Products Co., Inc., Salt Lake City, Utah
Niagara Machine & Tool Wks., Buffalo, N. Y.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Pacific Machine & Iron Wks., Tacoma, Wash.
Peck, Stow & Wilcox Co., Southington, Conn.
Snap-on Tools Corp., Kenosha, Wis.
Thor Tool & Die Co., San Leandro, Calif.
Viking Shear Co., Erie, Pa.
Whitney Mfg. Co., W. A., Rockford, Ill.
Wiss & Sons Co., J., Newark, N. J.

SHEAVES

See Pulleys and Sheaves, for Belt Drives

SHEET METAL BRAKES

See Brakes, Sheet Metal

SHEET METAL DUCTS

See Ducts and Duct Fittings, Prefabricated

SHEET METAL FITTINGS

See Ducts and Duct Fittings, Prefabricated

SHEET METAL PUNCHES

See Punches, Sheet Metal

SHEET, ALUMINUM

Aluminum Co. of America, Pittsburgh, Pa.
American Nickeloid Co., Peru, Ill. (Nickel and chromium plated)
Colonial Alloys Co., Metals Div., Philadelphia, Pa.
Fairmont Aluminum Co., Fairmont, W. Va.
Kaiser Aluminum & Chemical Corp., Oakland, Calif.
Revere Copper and Brass Inc., New York, N. Y.
Reynolds Metals Co., Louisville, Ky.

SHEETS, ALUMINUM COATED

Armco Steel Corp., Middletown, O.

SHEETS AND BOARD, NON-METALLIC, FOR DUCT CONSTRUCTION

Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Celotex Corp., The, Chicago, Ill.
Grant Wilson Inc., Chicago, Ill.
Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Keystone Asphalt Products Co., Chicago, Ill.
Panelyte Div., St. Regis Paper Co., New York, N. Y.
Ruberoid Co., New York, N. Y.
Sall Mountain Co., Hamilton, O.
Technical Ply-Woods, Chicago, Ill.

SHEETS, CLAD

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Aluminum Co. of America, Pittsburgh, Pa.
American Cladmetals Co., Carnegie, Pa. (Copper clad steel and stainless clad copper)
American Nickeloid Co., Peru, Ill.
Bart Mfg. Corp., Belleville, N. J.
Follansbee Steel Corp., Pittsburgh, Pa.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
Jessop Steel Co., Washington, Pa.
Lukens Steel Co. and Divisions, Coatsville, Pa.
Republic Steel Corp., Cleveland, O.
Wood Steel Co., Alan, Conshohocken, Pa.

SHEETS, COPPER

American Brass Co., Waterbury, Conn.
American Nickeloid Co., Peru, Ill. (Nickel and chromium plated)
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Hussey & Co., C. G., Div. Copper Range Co., Pittsburgh, Pa.
Inland Steel Products Co., Milwaukee, Wis.
New Haven Copper Co., The, Seymour, Conn.
Revere Copper and Brass, Inc., New York, N. Y.
Western Brass Mills, Metal, Div. of Olin Industries, Inc., East Alton, Ill. (Brass, bronze, phosphor bronze)

SHEETS, LEAD

Alpha Metals, Inc., Jersey City, N. J.
Belmont Smelting & Refining Wks., Inc., Brooklyn, N. Y.
Division Lead Co., Summit, Ill.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Flemm Lead Co., Inc., Long Island City, N. Y.
Gardiner Metal Co., Chicago, Ill.
Illinois Zinc Co., Chicago, Ill.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
National Lead Co., New York, N. Y.
Northwest Lead Co., Seattle, Wash.
Rochester Lead Wks., Rochester, N. Y.
Standard Rolling Mills, Inc., Brooklyn, N. Y.
Weirton Steel Co., Weirton, W. Va. (Alloy coated)

SHEETS, MAGNESIUM ALLOY

Dow Chemical Co., The, Midland, Mich.

SHEETS, METAL, WITH PROTECTIVE NON-METALLIC COATING

American Nickeloid Co., Peru, Ill.
American Steel Band Co., Pittsburgh, Pa.
Cheney Flashing Co., Trenton, N. J.
Plasteel Products Co., Washington, Pa.
Robertson Co., H. H., Pittsburgh, Pa.
Technical Ply-Woods, Chicago, Ill. (Metal and plywood)

SHEETS, NICKEL AND NICKEL ALLOY

American Nickeloid Co., Peru, Ill.
Chase Brass & Copper Co., Waterbury, Conn.
International Nickel Co., Inc., The, New York, N. Y.
Lukens Steel Co. and Divisions, Coatesville, Pa.
Revere Copper and Brass Incorporated, New York, N. Y.
Western Brass Mills, Metals Div. of Olin Industries, Inc., East Alton, Ill.

SHEETS, STEEL, COPPER BEARING

Armco Steel Corp., Middletown, O.
Berger Mfg. Div., Republic Steel Corp., Canton, O.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia-Geneva Steel (Div. United States Steel Corp.), San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Follansbee Steel Corp., Pittsburgh, Pa.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., Chicago, Ill.
Lukens Steel Co. and Divisions, Coatesville, Pa.
Newport Steel Corp., Newport, Ky.
Niles Rolling Mill Div., Sharon Steel Corp., Niles, O.
Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.
Tennessee Coal, Iron & Railroad Co., United States Steel Corp.

Subsidiary, Fairfield, Ala.
United States Steel Corp., Pittsburgh, Pa.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS, STEEL, GALVANIZED

Apollo Steel Co., Apollo, Pa.
Armco Steel Corp., Middletown, O.
Berger Mfg. Div., Republic Steel Corp., Canton, O.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia-Geneva (Div. United States Steel Corp.), San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Inland Steel Co., Chicago, Ill.
Newport Steel Corp., Newport, Ky.
Niles Rolling Mill Div., Sharon Steel Corp., Niles, O.
Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.
Tennessee Coal & Iron Div., United States Steel Corp., Fairfield, Ala.
United States Steel Corp., Pittsburgh, Pa.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wood Steel Co., Alan, Conshohocken, Pa.

SHEETS, STEEL, GALVANNEALED

Berger Mfg. Div., Republic Steel Corp., Canton, O.
Continental Steel Corp., Kokomo, Ind.
Columbia-Geneva Steel, (Div. United States Steel Corp.), San Francisco, Calif.
Newport Steel Corp., Newport, Ky.
Niles Rolling Mill Div., Sharon Steel Corp., Niles, O.
Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.
United States Steel Corp., Pittsburgh, Pa.

SHEETS, STEEL, STAINLESS

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
American Nickeloid Co., Peru, Ill.
Armco Steel Corp., Middletown, O.
Berger Mfg. Div., Republic Steel Corp., Canton, O.
Crucible Steel Co. of America, Pittsburgh, Pa.
Duriron Co., Inc., The, Dayton, O.
Eastern Stainless Steel Corp., Baltimore, Md.
Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
Jessop Steel Co., Washington, Pa.
Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.
Superior Steel Corp., Pittsburgh, Pa.
Tennessee Coal, Iron & Railroad Co., United States Steel Corp., Subsidiary, Fairfield, Ala.
United States Steel Corp., Pittsburgh, Pa.
Universal Cyclops Steel Corp., Bridgeville, Pa.
Washington Steel Corp., Washington, Pa.

SHEETS, WROUGHT IRON

Byers Co., A. M., Pittsburgh, Pa.

SHEETS, ZINC

American Nickeloid Co., Peru, Ill. (Nickel and chromium plated)
American Zinc Products Div., Ball Brothers Co., Greencastle, Ind.
Belmont Smelting & Refining Wks., Inc., Brooklyn, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Division Lead Co., Summit, Ill.
Hegeler Zinc Co., Danville, Ill.
Illinois Zinc Co., Chicago, Ill.
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
New Jersey Zinc Sales Co., New York, N. Y.

SHOCK ABSORBERS, LIQUID

See Absorbers, Shock, Liquid

SHUTTERS

See Louvers and Shutters

SIGHT GLASSES

See Glasses, Sight, for Pipe Lines

SIGNALS, LIQUID LEVEL

See Alarms, Liquid Level

SIGNALS, TANK FILL

See Alarms, Liquid Level

SILENCERS FOR REDUCING COMPRESSOR INTAKE NOISE

Air-Maze Corp., Cleveland, O.
Dollinger Corp., Rochester, N. Y.

SLEEVE BEARINGS

See Bearings, Sleeve

SLEEVES, PIPE REPAIR

See Clamps, Pipe Repair

SLIME AND ALGAE CONTROL, WATER TREATMENT FOR

See Treatment, Water, for Slime and Algae Control

SMOKE ALARMS

See Alarms, Smoke

SMOKE ELIMINATORS

See Jets, Overfire Air, for Smoke Abatement

SMOKE GUNS

See Guns and Pots, Smoke and Smudge

SMUDGE POTS

See Guns and Pots, Smoke and Smudge

SNOW MELTING ANTI-FREEZE

See Compounds, Anti-Freeze

SOFTENERS, WATER

Alrose Chemical Co., Providence, R. I.
American Water Softener Co., Philadelphia, Pa.
American Well Works, Aurora, Ill.
Anderson-Stolz Corp., Kansas City, Mo.
Belco Industrial Equipment Div., Inc., Paterson, N. J.
Bruner Corp., Milwaukee, Wis.
Chemical Engineering Co., Dallas, Tex.
Cochrane Corp., Philadelphia, Pa.
Culligan Inc., Northbrook, Ill.
Duro Co., Dayton, O.
Elgin-Refinite, Div. of Elgin Softener Corp., Elgin, Ill.
Elgin Softener Corp., Elgin, Ill.
General Filter Co., Ames, Ia.
Graver Water Conditioning Co., New York, N. Y.
Hungerford & Terry, Inc., Clayton, N. J.
Illinois Water Treatment Co., Rockford, Ill.
MacDermid Chemical Co., Bristol, Conn.
Myers & Bro. Co., F. E., The, Ashland, O.
Norwood Associated Engineers Inc., Springfield, Mass.
Permutit Co., New York, N. Y.
Research Products Corp., Madison, Wis.
Reynolds Shaffer Co., Detroit, Mich.
Sherwood Water Treatment Co., Inc., Beverly, N. J.
Stover Water Softener Co., St. Charles, Ill.
Uniflow Mfg. Co., Erie, Pa.
Warlo Corp., New York, N. Y.

SOLAR HEAT RESISTING LOUVERS AND SCREENS

See Louvers, Sun Reflecting; and Screens, Sun Reflecting

SOLDER (SILVER), BRAZING ALLOYS, AND FLUXES

Air Reduction Sale Co., New York, N. Y.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Allen Co., Inc., L. B., Chicago, Ill.
American Brass Co., Waterbury, Conn.
American Platinum Works, Newark, N. J.
Atkins Saw Div., Borg-Warner Corp., Indianapolis, Ind.
Baker & Co., Inc., Newark, N. J.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Chemalloy Associates, Santee, Calif.
Division Lead Co., Summit, Ill.
Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Handy & Harman, New York, N. Y.
Hardy, Inc., Charles, New York, N. Y.
Industrial Service Laboratories, Milwaukee, Wis.
Johnson Gas Appliance Co., Cedar Rapids, Ia.
Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Marquette Mfg. Co., Minneapolis, Minn.
Mir-O-Col Alloy Co., Inc., Los Angeles, Calif.
Mueller Brass Co., Port Huron, Mich.
National Cylinder Gas Co., Chicago, Ill.
Oxygen Equipment & Service Co., Chicago, Ill.
Powder Weld Process Co., The, Brooklyn, N. Y.
Rotometals, San Francisco, Calif.
Soldering Specialties Co., Summit, N. J.
Special Chemicals Corp., New York, N. Y.
Sulflo, Inc., Elizabeth, N. J.
Wabash Mfg. Co., Chicago, Ill.

SOLDER (TIN-LEAD), AND FLUXES

Allen Co., Inc., L. B., Chicago, Ill.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Alpha Metals, Inc., Jersey City, N. J.
American Brass Co., Waterbury, Conn.
American Solder & Flux Co., Philadelphia, Pa.

Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Benson Co., Inc., Alex R., Hudson, N. Y.
Burnley Battery & Mfg. Co., North East, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Chemalloy Associates, Santee, Calif.
Division Lead Co., Summit, Ill.
du Pont de Nemours & Co., E. I., Grasselli Chemicals Dept., Wilmington, Del.
Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Flemm Lead Co., Inc., Long Island City, N. Y.
Galv-Weld Products, Lima, O.
Gardiner Metal Co., Chicago, Ill.
Glaser Lead Co., Inc., Brooklyn, N. Y.
Hercules Chemical Co., Inc., New York, N. Y.
Industrial Service Laboratories, Milwaukee, Wis.
Johnson Gas Appliance Co., Cedar Rapids, Ia.
Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Johnson Foil Mfg. Co., The, St. Louis, Mo.
Kester Solder Co., Chicago, Ill.
Klauer Mfg. Co., Dubuque, Ia.
Lake Chemical Co., Chicago, Ill.
Lenk Mfg. Co., Boston, Mass.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
London Chemical Co., Chicago, Ill.
Merchant & Evans Co., Philadelphia, Pa.
Mueller Brass Co., Port Huron, Mich.
National Lead Co., New York, N. Y.
Northwest Lead Co., Seattle, Wash.
Paul-Lewis Laboratories, Inc., Milwaukee, Wis.
Potts-Farrington Co., Philadelphia, Pa.
Powder Weld Process Co., The, Brooklyn, N. Y.
Rochester Lead Works, Inc., Rochester, N. Y.
Rotometals, San Francisco, Calif.
Ruby Chemical Co., Columbus, O.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Soldering Specialties Co., Summit, N. J.
Special Chemicals Corp., New York, N. Y.
Standard Rolling Mills, Inc., Brooklyn, N. Y.
Sulflo, Inc., Elizabeth, N. J.
Utility Laboratory, Inc., Brooklyn, N. Y.
Wolfe-Kote Co., Inc., Sheboygan, Wis.

SOLENOIDS AND SOLENOID COILS

Allen-Bradley Co., Milwaukee, Wis.
Automatic Switch Co., Orange, N. J.
Barber-Colman Co., Rockford, Ill.
Birdsell Mfg. Co., Inc., Palo Alto, Calif.
B/W Controller Corp., Birmingham, Mich.
Cook Electric Co., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Dormeyer Industries, Chicago, Ill.
Essex Wire Corp., Ft. Wayne, Ind.
General Controls Co., Glendale, Calif. and Skokie, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
Hubbell Corp., Mundelein, Ill.
Jefferson Electric Co., Bellwood, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
McQuay-Norris Mfg. Co., St. Louis, Mo.
National Acme Co., The, Cleveland, O.
Soreng Products Corp., Schiller Park, Ill.
Synchro-Start Products, Inc., Skokie, Ill.
Trombetta Solenoid Corp., Milwaukee, Wis.

SOLENOID VALVES

See Valves, Solenoid

SOOT BLOWERS

See Blowers, Soot

SOOT DESTROYERS

See Destroyers, Soot, Chemical

SOUND CONTROL FOR COOLING TOWERS

See Noise Elimination for Cooling Towers

SOUND INDICATORS

See Indicators, Sound Level

SOUND TESTERS FOR LOCATING MECHANICAL TROUBLES

See Testers, Sound

SPARGER NOZZLES

See Nozzles, Sparger, for Tank Heating

SPEED CHANGERS

See Changers, Speed, Hydraulic Coupling; Changers, Speed, Mechanical

SPEED REDUCERS

See Reducers, Speed

SPIRAL PIPE

See Pipe, Spiral, Riveted and Welded

SPOT WELDERS

See Welders, Spot

SPRAY HUMIDIFIERS

See Humidifiers, Direct, Spray Head

SPRAY NOZZLES

See Nozzles, Spray

SPRAY PAINTING BOOTHS

See Booths, Painting, Spray

SPRINKLER HEADS

See Heads, Sprinkler

SPRINKLER SYSTEM CONTROLS

See Controls, Fire Protection Sprinkler System; Valves, Fire Protection Sprinkler System Control

STACKS AND CHIMNEYS, INDUSTRIAL, PREFABRICATED

Bigelow Co., The, New Haven, Conn.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Hodge Boiler Wks., East Boston, Mass.
Kellogg Co., M. W., The, New York, N. Y.
Prat-Daniel Corp., South Norwalk, Conn.
Van-Packer Corp., Chicago, Ill.

STAINLESS STEEL PIPE

See Pipe, Steel, Stainless

STAINLESS STEEL SHEETS

See Sheets, Steel, Stainless

STANDS, PIPE VISE

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Capewell Mfg. Co., Hartford, Conn.
International Forge Co., Chicago, Ill.
Leibfried Mfg. Corp., C. H., Brooklyn, N. Y.
Martin & Sons, H. P., Owensboro, Ky.
Nye Tool Co., Chicago, Ill.
Oster Mfg. Co., Cleveland, O.
Reed Mfg. Co., Erie, Pa.
Ridge Tool Co., Elyria, O.
Talon Tools, Inc., North Arlington, N. J.
Western Wire Products Co., St. Louis, Mo.
Williams & Co., J. H., Buffalo, N. Y.

STAPLES FOR FASTENING TUBING

See Hangers and Supports, Pipe

STARTERS, MOTOR

See Controllers and Starters, Motor

STEAM BOOSTER COMPRESSORS

See Compressors, Steam Booster

STEAM ENGINES

See Engines, Steam

STEAM GENERATORS

See Boilers

STEAM JET HEATERS

See Heaters, Steam Jet, for Liquids

STEAM JET REFRIGERATION

See Compressors, Refrigerating, Steam Jet

STEAM PRESSURE REGULATORS

See Valves, Pressure Reducing and Regulating

STEAM PUMPS

See Pumps, Steam

STEAM SEPARATORS

See Separators, Steam and Oil

STEAM TRAPS

See Traps, Steam

STEEL PIPE

See Pipe, Steel

STEEL TUBE FITTINGS, FLARED

See Fittings, Steel Tube, Flared

STEEL TUBING

See Tubing, Steel

STEEL UNIONS

See Unions, Steel

STEEL VALVES

See Valves, Gate; and Valves, Globe

STERILIZING LAMPS

See Lamps, Sterilizing, for Duct Installation

STERILIZING UNITS

See Units, Sterilizing, Air

STOCKS AND DIES

American Pipe Tool Co., Chicago, Ill.
Armstrong Mfg. Co., Bridgeport, Conn.
Beaver Pipe Tools, Inc., Warren, O.
Capewell Mfg. Co., Hartford, Conn.
Champion Blower & Forge Co., Lancaster, Pa.
Crown Die & Tool Co., Chicago, Ill. (Pipe)
Greenfield Tap & Die Corp., Greenfield, Mass.
Hollands Mfg. Co., Erie, Pa.
Nye Tool Co., Chicago, Ill.
Oster Mfg. Co., Cleveland, O.
Reed Mfg. Co., Erie, Pa.
Ridge Tool Co., Elyria, O.
Saunders Mfg. Co., Yonkers, N. Y.
Threadwell Tap & Die Co., Greenfield, Mass.
Toledo Pipe Threading Machine Co., Toledo, O.

STOKERS, INDUSTRIAL AND COMMERCIAL

61 *to* 1200 *Lb per Hr*

Allington & Curtis Mfg. Co., Saginaw, Mich. (For shavings, chips and sawdust)
American Coal Burner and Wood Stoker Corp., Chicago, Ill.
American Engineering Co., Philadelphia, Pa.
Anchor Div., Stratton & Terstegge Co., Inc., New Albany, Ind.
Auburn Burner Co., Auburn, Ind.
Auburn Foundry, Inc., Stoker Div., Auburn, Ind.
Automatic Firing Corp., St. Louis, Mo.
Babcock & Wilcox Co., New York, N. Y.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Canton Stoker Corp., Canton, O.
Carnes, Inc., John R., Lima, O.
Carpenter Heating & Stoker Co., Cleveland, O.
Central Rubber & Steel Corp., Findlay, O.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Combustion Engineering, Inc., New York, N. Y.
Detroit Stoker Co., Detroit, Mich.
Diamond Iron Works Co., Minneapolis, Minn.
Econocol Stoker Div. of Cotta Transmission Co., Rockford, Ill.
Eddy Stoker Corp., Chicago, Ill.
Electric Furnace-Man, Inc., Emmaus, Pa.
Erie City Iron Works, Erie, Pa.
Fire-King Stoker Co., Indianapolis, Ind.
Flynn & Emrich Co., Baltimore, Md.
Frederick Iron & Steel Inc., Frederick, Md.
Freeman Stoker Div., Illinois Iron & Bolt Co., Chicago, Ill.
Fuel Savers, Inc., Harrisburg, Pa.
General Machinery Co., Spokane, Wash.
Gross-Aire Mfg. Co., Overland, Mo.
Gunnite Foundries Corp., Rockford, Ill. (Screws)
Heating Assurance, Inc., Spokane, Wash.
Her-Born Engrg. & Mfg. Co., Sandusky, O.
Hershey Machine & Foundry Co., Motorstokor Div., Manheim, Pa. (anthracite)
Hoffman Combustion Engrg. Co., Detroit, Mich. (spreader type)
Holcomb & Hoke Mfg. Co., Inc., Indianapolis, Ind.
Iron Fireman Mfg. Co., Cleveland, O.
Johnston & Jennings Co., Cleveland, O.
Kingston Products Corp., Kokomo, Ind.
Kol-Master Corp., Oregon. Ill.
Laclede Stoker Co., St. Louis, Mo. (chain grate, spreader)
Leffel & Co., James, Springfield, O.
Loyal Knight Stokers, Inc., Belleville, Ill.
Mallory Sales Co., Dolton, Ill.
Meyer Furnace Co., The, Peoria, Ill.
Muncie Gear Wks., Inc., Muncie, Ind.
National Steam Pump Co., Upper Sandusky, O.
Newcomb-Detroit Co., Detroit, Mich.
Northern Steel & Stoker Corp., Peoria, Ill.
Ormsby-Osterman, Inc., St. Louis, Mo.
Perfection Grate & Stoker Co., Springfield, Mass.
Plymouth Industries, Inc., Plymouth, Ind.
Rheem Mfg. Co., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.
Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Sinker-Davis Co., Indianapolis, Ind.
Steel Products Engineering Co., Springfield, O.
Sun-Fire Stoker Corp., New Albany, Ind.
U. S. Machine Corp., Div. of Stewart-Warner Corp., Lebanon, Ind.
V. & E. Products, Inc., Schuylkill Haven, Pa.
Westinghouse Electric Corp., Pittsburgh, Pa.
Whiting Fire Power Products Corp., Superior, Wis.
Whitty Co., Inc., Boston, Mass. (Bituminous)
Will-Burt Co., The, Orrville, O.

STONEWARE PIPE

See Pipe, Stoneware

STORAGE WATER HEATERS

See Heaters, Water, Steam, Storage

STRAINERS, PIPE LINE

Air Maze Corp., Cleveland, O.
Alco Valve Co., St. Louis, Mo.
American District Steam Co., Inc., North Tonawanda, N. Y.
Aminco Refrigeration Products Co., Detroit, Mich.
Andale Co., Philadelphia, Pa.
Anderson Co., V. D., The, Cleveland, O.
Armstrong Machine Wks., Three Rivers, Mich.
Automatic Switch Co., Orange, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Barnes & Jones, Inc., Boston, Mass. (steam and water only)
Barrett, Haentjens & Co., Hazleton, Pa.
Bishop & Babcock Mfg. Co., Cleveland, O.
Blackmer Pump Co., Grand Rapids, Mich.
Bowser, Inc., Fort Wayne, Ind.
Boylston Steam Specialty Co., Chicago, Ill.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Cashin Co., W. D., Boston, Mass.
Clark Mfg. Co., Cleveland, O.
Coen Co., San Francisco, Calif.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
Cuno Engineering Corp., Meriden, Conn.
Davis Regulator Co., Chicago, Ill.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
De Zurik Shower Co., Sartell, Minn.
Eddington Metal Specialty Co., Eddington, Pa.
Edward Valves, Inc., East Chicago, Ind.
Elliott Co., Jeannette, Pa.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
Foster Pump Works, Inc., Union, N. Y.
General Controls Co., Glendale, Calif. and Skokie, Ill.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
Hays Mfg. Co., Erie, Pa.
Henry Valve Co., Melrose Park, Ill.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Hubbell Corp., Mundelein, Ill.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Kenmore Machine Products, Inc., Lyons, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Kieley & Mueller, Inc., Middletown, N. Y.
Kinney Mfg. Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y.
Leslie Co., Lyndhurst, N. J.
Madden Brass Products Co., Chicago, Ill.
Maid-O'-Mist, Inc., Chicago, Ill.
Marsh Heating Equipment Co., Skokie, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Monarch Mfg. Wks., Inc., Philadelphia, Pa.
Mueller Brass Co., Port Huron, Mich.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Long Island City, N. Y.
Newark Wire Cloth Co., Newark, N. J.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
OPW Corp., Cincinnati, O.
Phillips & Co., H. A., Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Roylon, Inc., Glendale, Calif.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Scientific Instrument Co., Detroit, Mich.
Shank Co., Cyrus, Cicero, Ill.
Sheffler-Gross Co., Philadelphia, Pa.
Smith Co., S. Morgan, York, Pa.
Spence Engineering Co., Inc., Walden, N. Y.
Spray Engineering Co., Somerville, Mass.
Spraying Systems Co., Bellwood, Ill.
Standard Machine & Mfg. Co., St. Louis, Mo.
Staples & Pfeiffer, San Francisco, Calif.
Sterling, Inc., Milwaukee, Wis.
Strong, Carlisle & Hammond Co., Cleveland, O.
Swartwout Co., The, Cleveland, O.

Trane Co., The, LaCrosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Trimount Rotary Power Co., Dedham, Mass.
Tryco Products, Inc., Westfield, Mass.
Walworth Co., New York, N. Y.
Warren Engineering Co., Broadway, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Webster & Co., Warren, Camden, N. J.
Webster Electric Co., Racine, Wis. (For oil burners)
Winslow Engineering Co., Oakland, Calif.
Wright-Austin Co., Detroit, Mich.
Yarnall-Waring Co., Philadelphia, Pa.
Zurn Mfg. Co., J. A., Industrial Div., Erie, Pa.

STRAINERS, SUCTION, FOR AIR WASHERS

Bahnson Co., Winston-Salem, N. C.
Eddington Metal Specialty Co., Eddington, Pa.

STRESS RELIEVERS

See Preheaters and Stress Relievers, Electric, for Pipe Welds

STRIP HEATERS

See Heaters, Strip and Immersion, Electric

STRUCTURAL SHAPES

See Angles, Bars, Beams, Channels and Tees

STUD DRIVERS

See Drills, Powder Operated

STUD WELDERS

See Welders, Stud

SUCTION LINE HEAT EXCHANGERS

See Exchangers, Heat, Refrigerant Suction Line

SUMP PUMPS

See Pumps, Sump

SUPERHEATERS, PROCESS STEAM

Alstrom Corp., Bronx, N. Y.
Babcock & Wilcox Co., New York, N. Y.
Bell & Gossett Co., Morton Grove, Ill.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Combustion Engineering, Inc., New York, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Edge Moor Iron Works, Inc., Edge Moor, Del.
Ewing Mfg. Co., Oklahoma City, Okla.
Foster Wheeler Corp., New York, N. Y.
General Heaters & Regulators Co., East Chicago, Ind.
Selas Corp. of America, Philadelphia, Pa.
Springfield Boiler Co., Springfield, Ill.
Union Iron Works, Erie, Pa.
Wiegand Co., Edwin L., Pittsburgh, Pa.

SURFACE, FINNED, COOLING, BRINE

Acme Industries, Inc., Jackson, Mich.
Aerofin Corp., Syracuse, N. Y.
American Blower Corp., Detroit, Mich.
Brown Fintube Co., The, Elyria, O.
Bush Mfg. Co., West Hartford, Conn.
Conditionaire Unit Co., Chicago, Ill.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Drayer-Hanson, Inc., Los Angeles, Calif.
G. & O. Mfg. Co., New Haven, Conn.
Griscom-Russell Co., The, Massillon, O.
Heatron, Inc., York, Pa.
Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Marlo Coil Co., St. Louis, Mo.
McCord Corp., Detroit, Mich.
McIntyre Engineering Co., Inc., South San Francisco, Calif.
McQuay, Inc., Minneapolis, Minn.
Murray Mfg. Co., D. J., Wausau, Wis.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Silco Products, Inc., Minneapolis, Minn.
Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering, Inc., Newark, N. J.
Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
Vilter Mfg. Co., Milwaukee, Wis.
Wolverine Tube Div., Calumet and Hecla, Inc., Detroit, Mich.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.

SURFACE, FINNED, COOLING, COLD WATER

Acme Industries, Inc., Jackson, Mich.
Aerofin Corp., Syracuse, N. Y.
American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
Bayley Blower Co., Milwaukee, Wis.
Brown Fintube Co., The, Elyria, O.
Bush Mfg. Co., West Hartford, Conn.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Conditionaire Unit Co., Chicago, Ill.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Drayer-Hanson, Inc., Los Angeles, Calif.
Frigidaire Div., General Motors Corp., Dayton, O.
G. & O. Mfg. Co., New Haven, Conn.
Governair Corp., Oklahoma City, Okla.
Griscom-Russell Co., The, Massillon, O.
Hastings Air Conditioning Co., Hastings, Neb.
Heatron, Inc., York, Pa.
Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Marlo Coil Co., St. Louis, Mo.
McCord Corp., Detroit, Mich.
McIntyre Engineering Co., Inc., South San Francisco, Calif.
McQuay, Inc., Minneapolis, Minn.
Modine Mfg. Co., Racine, Wis.
Murray Mfg. Co., D. J., Wausau, Wis.
Nesbitt, Inc., John J., Philadelphia, Pa.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Pleasantaire Corp., Washington, D. C.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rittling Corp., The, Buffalo, N. Y.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Silco Products, Inc., Minneapolis, Minn.
Super-Cold Corp., Los Angeles, Calif.
Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering, Inc., Newark, N. J.
Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
Union Asbestos & Rubber Co., Chicago, Ill.
United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wing Mfg. Co., L. J., Linden, N. J.
Wolverine Tube Div., Calumet & Hecla, Inc., Detroit, Mich.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.

SURFACE, FINNED, COOLING, DIRECT EXPANSION

Acme Industries, Inc., Jackson, Mich.
Aerofin Corp., Syracuse, N. Y.
American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
Bayley Blower Co., Milwaukee, Wis.
Betz Corp., Hammond, Ind.
Brown Fintube Co., The, Elyria, O.
Bush Mfg. Co., West Hartford, Conn.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Conditionaire Unit Co., Chicago, Ill.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Drayer-Hanson, Inc., Los Angeles, Calif.
Frigidaire Div., General Motors Corp., Dayton, O.
G. & O. Mfg. Co., New Haven, Conn.
Governair Corp., Oklahoma City, Okla.
Griscom-Russell Co., The, Massillon, O.
Hastings Air Conditioning Co., Hastings, Neb.
Heatron, Inc., York, Pa.
Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Marlo Coil Co., St. Louis, Mo.
McCord Corp., Detroit, Mich.
McIntyre Engineering Co., Inc., South San Francisco, Calif.

McQuay, Inc., Minneapolis, Minn.
Merchant & Evans Co., Philadelphia, Pa.
Modine Mfg. Co., Racine, Wis.
Murray Mfg. Co., D. J., Wausau, Wis.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Pleasantaire Corp., Washington, D. C.
Refrigeration Appliances Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Silco Products, Inc., Minneapolis, Minn.
Super-Cold Corp., Los Angeles, Calif.
Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering, Inc., Newark, N. J.
Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
Union Asbestos & Rubber Co., Chicago, Ill.
United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wolverine Tube Div., Calumet and Hecla, Inc., Detroit, Mich.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.

SURFACE, FINNED, HEATING AND COOLING, PRE-ASSEMBLED, INCLUDING COILS, ELIMINATOR PLATES, SETTLING TANK, AND CASING

Clarage Fan Co., Kalamazoo, Mich.
Rome-Turney Radiator Co., Rome, N. Y.

SURFACE, FINNED, HEATING, INDIRECT, FERROUS

Bayley Blower Co., Milwaukee, Wis.
Brown Fintube Co., The, Elyria, O.
Bush Mfg. Co., West Hartford, Conn.
Conditionaire Unit Co., Chicago, Ill.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Drayer-Hanson, Inc., Los Angeles, Calif.
G. & O. Mfg. Co., New Haven, Conn.
Griscom-Russell Co., The, Massillon, O.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Marlo Coil Co., St. Louis, Mo.
Modine Mfg. Co., Racine, Wis.
Murray Mfg. Co., D. J., Wausau, Wis.
National Radiator Co., The, Johnstown, Pa.
New York Blower Co., Chicago, Ill.
Niagara Blower Co., New York, N. Y.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Rigidbilt Inc., Chicago, Ill.
Rittling Corp., The, Buffalo, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Silco Products Inc., Minneapolis, Minn.
Tenney Engineering, Inc., Newark, N. J.
Trane Co., The, LaCrosse, Wis.
Union Asbestos & Rubber Co., Chicago, Ill.
Vulcan Radiator Co., Hartford, Conn.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

SURFACE, FINNED, HEATING, INDIRECT, NON-FERROUS

Aerofin Corp., Syracuse, N. Y.
American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
Bayley Blower Co., Milwaukee, Wis.
Brown Fintube Co., The, Elyria, O.
Bush Mfg. Co., West Hartford, Conn.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Drayer-Hanson, Inc., Los Angeles, Calif.
Frigidaire Div., General Motors Corp., Dayton, O.
G. & O. Mfg. Co., New Haven, Conn.
Governair Corp., Oklahoma City, Okla.
Griscom-Russell Co., The, Massillon, O.
Hastings Air Conditioning Co., Hastings, Neb.
Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Marlo Coil Co., St. Louis, Mo.
McCord Corp., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
Modine Mfg. Co., Racine, Wis.
Murray Mfg. Co., D. J., Wausau, Wis.
Nesbitt, Inc., John J., Philadelphia, Pa.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rittling Corp., The, Buffalo, N. Y.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Silco Products Inc., Minneapolis, Minn.
Super-Cold Corp., Los Angeles, Calif.
Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering, Inc., Newark, N. J.
Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
Union Asbestos & Rubber Co., Chicago, Ill.
United States Air Conditioning Corp., Minneapolis, Minn.
Vulcan Radiator Co., Hartford, Conn.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wing Mfg. Co., L. J., Linden, N. J.
Wolverine Tube Div., Calumet and Hecla, Inc., Detroit, Mich.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.

SURFACE THERMOSTATS

See Thermostats, Surface

SUSPENDED FURNACES

See Heaters, Air

SWING JOINTS

See Joints, Pipe, Flexible Swing and Revolving

SWITCHES, ELECTRICAL

Acro Mfg. Co., The, Columbus, O.
Adam Electric Co., Frank, St. Louis, Mo.
Aerotec Corp., The, Greenwich, Conn.
Allen-Bradley Co., Milwaukee, Wis.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
Automatic Switch Co., Orange, N. J.
Barber-Colman Co., Rockford, Ill.
Benjamin Electric Mfg. Co., Des Plaines, Ill.
Clark Controller Co., Cleveland, O.
Congress Fan & Electric Co., Daytona Beach, Fla.
Cooper Co., Clark, Palmyra, N. J.
Crise Mfg. Co., The, Columbus, O.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument & Regulator Co., St. Louis, Mo.
Delta-Star Electric Co., Div. of H. K. Porter Co., Inc., Chicago, Ill.
Electric Controller & Mfg. Co., Cleveland, O.
Electric Machinery Mfg. Co., Minneapolis, Minn.
Electro-Switch & Controls, Inc., Culver City, Calif.
Furnas Electric Co., Batavia, Ill.
General Controls Co., Glendale, Calif. and Skokie, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
Hart Mfg. Co., Hartford, Conn.
McDonnell & Miller, Inc., Chicago, Ill.
Mercoid Corp., Chicago, Ill.
Micro Div. of Minneapolis-Honeywell Regulator Co., Freeport, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monitor Controller Co., The, Boston, Mass.
Morse-Smith-Morse, Inc., Watertown, Mass.
National Acme Co., The, Cleveland, O.
Penn Controls, Inc., Goshen, Ind.
Pyle-National Co., The, Chicago, Ill.
Square D Co., Detroit, Mich.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Struthers-Dunn, Inc., Philadelphia, Pa.
Tork Clock Co., Inc., Mount Vernon, N. Y.
Trumbull Components Dept., General Electric Co., Plainville, Conn.
Unimax Switch Div., W. L. Maxson Corp., New York, N. Y.
Ward Leonard Electric Co., Mount Vernon, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.
White-Rodgers Electric Co., St. Louis, Mo.
Zenith Electric Co., Chicago, Ill.

SWITCHES, FLOAT, REFRIGERATION

Alco Valve Co., St. Louis, Mo.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
Clark Controller Co., Cleveland, O.
Frick Co., Waynesboro, Pa.
Magnetrol, Inc., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Mercoid Corp., The, Chicago, Ill.
Soreng Products Corp., Schiller Park, Ill.
Square D Co., Industrial Controller Div., Milwaukee, Wis.

SWITCHES, FLOW

Cook Electric Co., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Coral Designs Div. of Henry G. Dietz Co., Long Island City, N. Y.
Drying Systems, Inc., Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
General Controls Co., Glendale, Calif. and Skokie, Ill.
Hays Mfg. Co., Erie, Pa.

Magnetrol, Inc., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Penn Controls, Inc., Goshen, Ind.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.

SWITCHES, LIQUID LEVEL

Acro Mfg. Co., The, Columbus, O.
Alco Valve Co., St. Louis, Mo.
Allen-Bradley Co., Milwaukee, Wis.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
Automatic Control Co., St. Paul, Minn.
B/W Controller Corp., Birmingham, Mich.
Bennett Oil Co., Omaha, Neb.
Cissell Mfg. Co., Inc., W. M., Louisville, Ky.
Cook Electric Co., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Coral Designs Div. of Henry G. Dietz Co., Long Island City, N. Y.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument & Regulator Co., St. Louis, Mo.
Detroit Controls Corp., Detroit, Mich.
Fielden Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Fischer & Porter Co., Hatboro, Pa.
Furnas Electric Co., Batavia, Ill.
General Controls Co., Glendale, Calif. and Skokie, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hays Mfg. Co., Erie, Pa.
Healy Ruff Co., St. Paul, Minn.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
Kenco Pump Co., Lorain, O.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Magnetrol Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Mercoid Corp., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Monitor Controller Co., The, Boston, Mass.
Newark Controls Co., Bloomfield, N. J.
Penn Controls, Inc., Goshen, Ind.
Photoswitch, Inc., Cambridge, Mass.
Ripley Co., Inc., Middletown, Conn.
Schaub Engineering Co., Fred H., Chicago, Ill.
Soreng Products Corp., Schiller Park, Ill.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Westinghouse Electric Corp., Pittsburgh, Pa.

SWITCHES, MERCURY

Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Durakool, Inc., Elkhart, Ind.
G. M. Mfg. Co., New York, N. Y.
General Controls Co., Glendale, Calif. and Skokie, Ill.
Mercoid Corp., Chicago, Ill.
Micro Div. of Minneapolis Honeywell Reg. Co., Freeport, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Newark Controls Co., Bloomfield, N. J.
Westinghouse Electric Corp., Pittsburgh, Pa.

SWITCHES, PNEUMATIC

Automatic Control Co., St. Paul, Minn.
Bristol Co., The, Waterbury, Conn.
Cook Electric Co., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Square D Co., Industrial Controller Div., Milwaukee, Wis.

SWITCHES, PRESSURE AND VACUUM

Aerotec Corp., The, Greenwich, Conn.
Allen-Bradley Co., Milwaukee, Wis.
Au-Temp-Co Corp., New York, N. Y.
Automatic Control Co., St. Paul, Minn.
Barber-Colman Co., Rockford, Ill.
Barksdale Valves, Los Angeles, Calif.
Bristol Co., The, Waterbury, Conn.
Clark Controller Co., Cleveland, O.
Cook Electric Co., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Coral Designs Div. of Henry G. Dietz Co., Long Island City, N. Y.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument & Regulator Co., St. Louis, Mo.
Detroit Controls Corp., Detroit, Mich.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Furnas Electric Co., Batavia, Ill.
General Controls Corp., Glendale, Calif. and Skokie, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Giannini & Co., Inc., G. M., Pasadena, Calif.
H-B Instrument Co., Philadelphia, Pa.
Healy Ruff Co., St. Paul, Minn.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
McQuay-Norris Mfg. Co., St. Louis, Mo.
Mercoid Corp., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Monitor Controller Co., The, Boston, Mass.
Newark Controls Co., Bloomfield, N. J.
Penn Controls, Inc., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Ranco, Inc., Columbus, O.
Shallcross Controls, Inc., Milwaukee, Wis.
Soreng Products Corp., Schiller Park, Ill.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Square D Co., Detroit, Mich.
United States Gauge Div. of American Machine and Metals, Inc., Sellersville, Pa.
Westinghouse Electric Corp., Pittsburgh, Pa.
White-Rodgers Electric Co., St. Louis, Mo.

SWITCHES, TIME

A'G'A Div. of Elastic Stop Nut Corp. of America, Elizabeth, N. J.
Allen-Bradley Co., Milwaukee, Wis.
April Showers Co., Inc., Washington, D. C.
Au-Temp-Co Corp., New York, N. Y.
Automatic Devices Co., Inc., Western Springs, Ill.
Automatic Electric Mfg. Co., Mankato, Minn.
Automatic Switch Co., Orange, N. J.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Cooper Co., Clark, Palmyra, N. J.
Durakool, Inc., Elkhart, Ind.
Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
Electric Switch & Controls, Inc., Culver City, Calif.
General Controls Corp., Glendale, Calif. and Skokie, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hansen Mfg. Co., Princeton, Ind. (timing motors and time machine)
Haydon Mfg. Co., Inc., Sub. General Time Instruments Corp., Torrington, Conn.
Heat Timer Corp., New York, N. Y.
Industrial Engineering Corp., Terre Haute, Ind.
International Business Machines Corp., New York, N. Y.
International Register Co., Chicago, Ill.
Landis & Gyr, Inc., New York, N. Y.
Mercoid Corp., Chicago, Ill.
Miller-Harris Instrument Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
National Time & Signal Corp., Detroit, Mich.
Paragon Electric Co., Two Rivers, Wis.
Perfex Corp., Milwaukee, Wis.
Photoswitch, Inc., Cambridge, Mass.
Precision Products, Inc., Tulsa, Okla.
Reliance Automatic Lighting Co., Racine, Wis.
Reynolds Electric Co., River Grove, Ill.
Rhodes, Inc., M. H., Hartford, Conn.
Ripley Co., Inc., L-R Blower Div., Middletown, Conn.
Sangamo Electric Co., Springfield, Ill.
Soreng Products Corp., Schiller Park, Ill.
Telechron Dept., General Electric Co., Ashland, Mass.
Time 'Trol Co., Great Neck, L. I., N. Y.
Tork Clock Co., Inc., Mount Vernon, N. Y.
Ward Leonard Electric Co., Mount Vernon, N. Y.
Webster & Co., Warren, Camden, N. J.
Westinghouse Electric Corp., Pittsburgh, Pa.
White-Rodgers Electric Co., St. Louis, Mo.
Zenith Electric Co., Chicago, Ill.

SWIVEL PIPE COUPLINGS

See Joints, Pipe, Flexible Swing and Revolving

SYSTEMS, COMBUSTION CONTROL

Ace Instrument Co., Inc., Brooklyn, N. Y.
Askania Regulator Co., Chicago, Ill.
Aurora Pump Co., Aurora, Ill.
Bailey Meter Co., Cleveland, O.
Barber-Colman Co., Rockford, Ill.
Bowser, Inc., Fort Wayne, Ind.
Bristol Co., Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Canton Stoker Corp., Canton, O.
Cash Co., A. W., Decatur, Ill.
Cleveland Fuel Equipment Co., Cleveland, O.
Combustion Control Corp., Boston, Mass.
Copes-Vulcan Div., Continental Foundry & Machine Co., Erie, Pa.
Defender Instrument & Regulator Co., St. Louis, Mo.
De-Tec-Tronic Laboratories, Inc., Chicago, Ill.
Engineer Co., New York, N. Y.
Ess Instrument Co., Bergenfield, N. J.
Fischer & Porter Co., Hatboro, Pa.
General Electric Co., Apparatus Dept., Schenectady, N. Y.

General Power Plant Corp., Ossining, N. Y.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Iron Fireman Mfg. Co., Cleveland, O.
Leahy Mfg. Co., Los Angeles, Calif.
Lientz Co., B. P., Kansas City, Mo.
Mercoid Corp., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Perfex Corp., Milwaukee, Wis.
Republic Flow Meters Co., Chicago, Ill.
Selas Corp. of America, Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Stout & Sons, David, St. Louis, Mo.
Webster Engineering Co., Tulsa, Okla.
Wing Mfg. Co., L. J., Linden, N. J.

SYSTEMS, CONDENSATE RETURN

Acker Organization, Inc., W. M., Cleveland, O.
Advance Pump Co., Berkeley, Calif.
Aurora Pump Co., Aurora, Ill.
Barnes & Jones, Inc., Boston, Mass.
Cissell Mfg. Co., Inc., W. M., Louisville, Ky.
Dunham Co., C. A., Chicago, Ill.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Jacuzzi Bros., Inc., Richmond, Calif.
Johnson Corp., The, Three Rivers, Mich.
Lattner Mfg. Co., P. M., Cedar Rapids, Iowa
Orr & Sembower, Inc., Reading, Pa.
Roth Co., Roy E., Rock Island, Ill.
Sterling Engineering & Mfg. Corp., Hyde Park, Mass.
Stout & Sons, David, St. Louis, Mo.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Templeton Bros., Hyde Park, Mass.
York-Shipley, Inc., York, Pa.

SYSTEMS, ELECTRIC PIPE HEATING

Fluid Systems, Inc., New Haven, Conn.
Hynes Electric Heating Div., Turbine Equipment Co., Westfield, N. J.
Industrial Engineering & Equipment Co., St. Louis, Mo.
Trent, Inc., Philadelphia, Pa.
Wiegand Co., Edwin L., Pittsburgh, Pa.

SYSTEMS, FIRE EXTINGUISHING, AND HEAT AND SMOKE DETECTORS

Allen Mfg. Co., W. D., Chicago, Ill.
C-O-Two Fire Equipment Co., Newark, N. J.
Cardox Corp., Chicago, Ill.
Edison, Inc., Thomas A., West Orange, N. J.
Grinnell Co., Inc., Providence, R. I.
Merchant & Evans Co., Philadelphia, Pa.
Raisler Corp., Grimes Sprinkler Div., New York, N. Y.
Rockwood Sprinkler Co., Worcester, Mass.

SYSTEMS, HEATING, HIGH TEMPERATURE HOT WATER

Over 350 F

American Hydrotherm Corp., Long Island City, N. Y.
International Boiler Works, The, East Stroudsburg, Pa.
Ross Engineering Corp., J. O., New York, N. Y.

SYSTEMS, HEATING, HOT WATER

Baseline Mfg. Co., Minneapolis, Minn.
Bell & Gossett Co., Morton Grove, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Dunham Co., C. A., Chicago, Ill.
General Heaters & Regulators Co., East Chicago, Ind.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Hook & Ackerman, Inc., New York, N. Y.
Kainer & Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Sullivan Valve & Engineering Co., Butte, Mont.
Taco Heaters, Inc., Providence, R. I.
Thrush & Co., H. A. Peru, Ind.
Trane Co., The, La Crosse, Wis.
Triplex Heating Speciality Co., Inc., Peru, Ind.
Webster & Co., Warren, Camden, N. J.

SYSTEMS, HEATING, VACUUM

Anderson Products, Inc., Cambridge, Mass.
Barnes & Jones, Inc., Boston, Mass.
Cashin Co., W. D., Boston, Mass.
Dunham Co., C. A., Chicago, Ill.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Marsh Heating Equipment Co., Skokie, Ill.
Monash-Younker Co., Inc., Chicago, Ill.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Trane Co., The, La Crosse, Wis.
Webster & Co., Warren, Camden, N. J.
Whittington Pump & Engineering Corp., Indianapolis, Ind.

SYSTEMS, HEATING, VAPOR

Barnes & Jones, Inc., Boston, Mass.
Cashin Co., W. D., Boston, Mass.
Dunham Co., C. A., Chicago, Ill.
Gorton Heating Corp., Cranford, N. J.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Marsh Heating Equipment Co., Skokie, Ill.
Monash-Younker Co., Inc., Chicago, Ill.
Radiator Valve Co. of America, Philadelphia, Pa.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Trane Co., The, La Crosse, Wis.
Webster & Co., Warren, Camden, N. J.

SYSTEMS, HEATING, ZONE CONTROL

Acro Mfg. Co., The, Columbus, O.
Au-Temp-Co Corp., New York, N. Y.
Automatic Devices Co., Inc., Western Springs, Ill.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Barber-Colman Co., Rockford, Ill.
Barnes & Jones, Inc., Boston, Mass.
Bell & Gossett Co., Morton Grove, Ill.
Dunham Co., C. A., Chicago, Ill.
General Heaters & Regulators Co., East Chicago, Ind.
Heat Timer Corp., New York, N. Y.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Mercoid Corp., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
SelecTemp Div., Iron Fireman Mfg. Co., Cleveland, O.
Simplex Heating Specialty Co., Inc., Lynchburg, Va.
Sullivan Valve & Engineering Co., Butte, Mont.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, La Crosse, Wis.
Webster & Co., Warren, Camden, N. J.
Zone-Heat Regulator Co., Garrettsville, O.

SYSTEMS, HOT GAS DEFROSTING, FOR REFRIGERATION

Bush Mfg. Co., West Hartford, Conn.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
McQuay, Inc., Minneapolis, Minn.
Penn Controls, Inc., Goshen, Ind.
Tenney Engineering, Inc., Newark, N. J.
Vilter Mfg. Co., The, Milwaukee, Wis.

SYSTEMS, PROCESS HEATING, HIGH TEMPERATURE

American Hydrotherm Corp., Long Island City, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Dow Chemical Co., The, Midland, Mich.
Dravo Corp., Pittsburgh, Pa.
Drying Systems, Inc., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Hynes Electric Heating Div., Turbine Equipment Co., Westfield, N. J.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
International Boiler Works, The, East Stroudsburg, Pa.
Mitchell & Co., Inc., W. K., Philadelphia, Pa.
Olson & Co., Arthur A., Canfield, O.
Parks-Cramer Co., Fitchburg, Mass.
Peabody Engineering Corp., New York, N. Y.
Ross Engineering Corp., J. O., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Selas Corp. of America, Philadelphia, Pa.
St. Louis Blow Pipe & Heater Co., Div. of Young Sales Corp., St. Louis, Mo.
Struthers Wells Corp., Titusville, Pa.
Trane Co., The, La Crosse, Wis.
Trent, Inc., Philadelphia, Pa.
Wing Mfg. Co., L. J., Linden, N. J.

SYSTEMS, ROOF SPRAYING (FOR COOLING ROOFS)

April Showers Co., Inc., Washington, D. C.
Binks Mfg. Co., Chicago, Ill.
Ross Sprinkler Co., Pasadena, Calif.
Ruppright, Siegfried, Los Angeles, Calif.
Skinner Irrigation Co., Troy, O.
Spray Engineering Co., Somerville, Mass.
Spraying Systems Co, Bellwood, Ill.
Water Cooling Corp., New York, N. Y.

TAGS, VALVE, FOR IDENTIFYING VALVES

Chase Brass & Copper Co., Waterbury, Conn.
Meyer & Wenthe, Inc., Chicago, Ill.

TANK FITTINGS

See Fittings and Bushings, Fuel Oil Tank

TANK HEADS

See Parts, for Heating and Air Conditioning Equipment

TANKS, BLOWOFF

American District Steam Co., Inc., North Tonawanda, N. Y.
Bigelow Co., The, New Haven, Conn.
Buffalo Tank Corp., Newark, N. J.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Downingtown Iron Works, Downingtown, Pa.
Hoppes Mfg. Co., Inc., Springfield, O.
International Boiler Works Co., The, East Stroudsburg, Pa.
Koven & Bro., L. O., Inc., Jersey City, N. J.
Manitowoc Shipbuilding, Inc., Manitowoc, Wis.
Murray Iron Wks. Co., Burlington, Ia.
Nooter Corp., St. Louis, Mo.
Norse Boiler Co., Inc., New Market, N. J.
Quaker City Iron Wks., Philadelphia, Pa.
Richmond Engineering Co., Inc., Richmond, Va.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Union Iron Works, Erie, Pa.
Wright-Austin Co., Detroit, Mich.

TANKS, EXPANSION, FOR HOT WATER HEATING SYSTEMS

American District Steam Co., Inc., North Tonawanda, N. Y.
Baseline Mfg. Co., Minneapolis, Minn.
Bell & Gossett Co., Morton Grove, Ill.
Biggs Boiler Works Co., E. Akron, O.
Birchfield Boiler, Inc., Tacoma, Wash.
Buffalo Tank Corp., Newark, N. J.
Caldwell Co., W. E., Louisville, Ky.
Case & Son Mfg. Co., W. A., Buffalo, N. Y.
Copper Boiler & Heater Wks., Manitowoc, Wis.
General Heaters & Regulators Co., East Chicago, Ind.
Kehm Corp., The, Chicago, Ill.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Maysteel Products, Inc., Milwaukee, Wis.
Morrison Brothers Co., Dubuque, Ia.
Norse Boiler Co., Inc., New Market, N. J.
Quaker City Iron Wks., Philadelphia, Pa.
Rheem Mfg. Co., New York, N. Y.
Richmond Engineering Co., Inc., Richmond, Va.
Scaife Co., Oakmont, Pa.
Taco Heaters, Inc., Providence, R. I.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, La Crosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Western Blower Co., Seattle, Wash.
Wood Co., John, Conshohocken, Pa.

TANKS, PROCESS AND STORAGE

Alert Boiler & Mfg. Co., Detroit, Mich.
Aluminum Co. of America, Pittsburgh, Pa.
American Car & Foundry Co., New York, N. Y.
American District Steam Co., Inc., North Tonawanda, N. Y.
American Hard Rubber Co., New York, N. Y. (Rubber lined)
American Moistening Co., Providence, R. I.
American Pipe & Steel Corp., Alhambra, Calif.
American Shipbuilding Co., Cleveland, O.
Armco Drainage & Metal Products, Inc., Middletown, O.
Bell & Gossett Co., Morton Grove, Ill.
Bigelow Co., New Haven, Conn.
Biggs Boiler Wks. Co., E. Akron, O.
Birchfield Boiler, Inc., Tacoma, Wash.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Buffalo Tank Corp., Newark, N. J.
Caldwell Co., W. E., Louisville, Ky.
Case & Son Mfg. Co., W. A., Buffalo, N. Y.
Chicago Bridge & Iron Co., Chicago, Ill.
Chicago Steel Tank Co., Chicago, Ill.
Cincinnati Metalcrafts Inc., Cincinnati, O.
Columbian Steel Tank Co., Kansas City, Mo.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Connery Construction Co., Philadelphia, Pa.
Copper Boiler & Heater Wks., Manitowoc, Wis.
Dahlquist Mfg. Co., Div. of Process Engineering Inc., Somerville, Mass.
Day Co., The, Minneapolis, Minn.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Dillon Steam Boiler Wks., Inc., D. M., Fitchburg, Mass.
Downingtown Iron Works, Downingtown, Pa.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Elastic Porcelain Lining Corp., Rochester, N. Y. (Tank linings)
Erie City Iron Wks., Erie, Pa.
Falstrom Co., Passaic, N. J.
Farrar & Trefts, Buffalo, N. Y.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
Frick Co., Waynesboro, Pa.
Gehri Co., Tacoma, Wash.
General Ceramics & Steatite Corp., Keasbey, N. J. (chemical stoneware & porcelain)
General Fittings Co., Providence, R. I.
Gerstein & Cooper, Inc., South Boston, Mass.
Goodrich Co., B. F., Akron, O. (Rubber lined)
Graver Tank & Mfg. Co., Inc., East Chicago, Ind.
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio
Hodge Boiler Works, East Boston, Mass.
Hoppes Mfg. Co., Inc., Springfield, O.
International Boiler Wks., The, East Stroudsburg, Pa.
Kaustine Furnace & Tank Corp., Perry, N. Y.
Kirk & Blum Mfg. Co., Cincinnati, O.
Knight, Maurice A., Akron, O.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Lead Lined Iron Pipe Co., Wakefield, Mass.
Littleford Bros. Inc., Cincinnati, O.
Lumm Co., A. H., Toledo, O.
Manitowoc Shipbuilding, Inc., Manitowoc, Wis.
Maysteel Products, Inc., Milwaukee, Wis.
Meldon Industries Div., Tool Industries, Inc., Detroit, Mich.
Mesker Steel Corp., Geo. L., Evansville, Ind.
Murray Iron Wks. Co., Burlington, Ia.
National Metal Fabricators, Chicago, Ill.
Newcomb-Detroit Co., Detroit, Mich.
Nooter Corp., St. Louis, Mo.
Norse Boiler Co., Inc., New Market, N. J.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa. (glass)
Quaid Fabrications, Inc., Philadelphia, Pa.
Quaker City Iron Wks., Philadelphia, Pa.
Reco Products Div., Recony Corp., New York, N. Y.
Richmond Engineering Co., Inc., Richmond, Va.
Roessing Mfg. Co., Pittsburgh, Pa.
Rosebraugh Co., W. W., Salem, Ore.
Roth Co., Roy E., Rock Island, Ill.
Santa Fe Tank & Tower Co., Los Angeles, Calif.
Scaife Co., Oakmont, Pa.
Sims Co., Erie, Pa.
Struthers Wells Corp., Titusville, Pa.
Terre Haute Boiler Works Co., Terre Haute, Ind.
Tippett & Wood, Phillipsburg, N. J.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Van Noordeen Co., E., Boston, Mass.
Walsh Holyoke Boiler Wks. Div., Continental Copper & Steel Industries, Inc., Holyoke, Mass.
Warner Lewis Co., Tulsa, Okla.
Western Blower Co., Seattle, Wash.
Whitlock Mfg. Co., Hartford, Conn.
Wood Co., John, Conshohocken, Pa.
Zingheim Co., William C., Chicago, Ill.

TAPE, INDUSTRIAL, ADHESIVE

Boston Woven Hose & Rubber Co., Cambridge, Mass.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Firestone Industrial Products Co., Akron, O.
Goodrich, B. F., Akron, O.
Irvington Varnish & Insulator Div. of Minnesota Mining & Mfg. Co., Irvington, N. J.
Johns-Manville, New York, N. Y.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
New York Belting & Packing Co., Passaic, N. J.
Owens-Corning Fiberglas Corp., Toledo, O.
Polyken Products, Dept. of the Kendall Co., Chicago, Ill.
Products Research Co., Los Angeles, Calif.
Seamless Rubber Co., The, F.O.S. Industrial Tape Div., New Haven, Conn.
United States Rubber Co., New York, N. Y.

TAPS, PIPE

Capewell Mfg. Co., Hartford, Conn.
Continental Screw Co., New Bedford, Mass.
Crown Die & Tool Co., Chicago, Ill.
Greenfield Tap & Die Corp., Greenfield, Mass.

Landis Machine Co., Inc., Waynesboro, Pa.
Threadwell Tap & Die Co., Greenfield, Mass.

TELEVISION, INDUSTRIAL, CLOSED-CIRCUIT

Diamond Power Specialty Corp., Lancaster, O.
Radio Corp. of America, Engineering Products Dept., Camden, N. J.

TEMPERATURE AND HUMIDITY CONTROLS

See Humidistats; Recorder-Controllers; Thermostats

TEMPERATURE RECORDERS

See Recorders, Temperature

TEMPERATURE REGULATORS

See Regulators, Temperature

TEMPLATES, DRAWING, PIPING

Dietzgen Co., Eugene, Chicago, Ill.
Graphic Indicator Co., Los Angeles, Calif.

TEST CHAMBERS

See Chambers, Test, Controlled Temperature and Humidity

TESTERS, DUST SPOT, FOR AIR FILTERS

Trion, Inc., McKees Rocks, Pa.

TESTERS, GAGE, DEAD WEIGHT

American Instrument Co., Inc., Silver Spring, Md.
Ashton Valve Co., Cambridge, Mass.
Crosby Steam Gage & Valve Co., Wrentham, Mass.
Dillon Co., Inc., W. C., Forest Park, Ill.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Mansfield & Green, Cleveland, O.

TESTERS, LEAK, FOR PIPING AND VESSELS

American Pipe & Steel Corp., Alhambra, Calif.
Greer Hydraulics, Inc., Brooklyn, N. Y.
Johnson-Williams Ltd., Palo Alto, Calif.
Whittington Pump & Engineering Corp., Indianapolis, Ind.

TESTERS, SOUND, FOR LOCATING MECHANICAL TROUBLES

Airserco Mfg. Co., Inc., Pittsburgh, Pa.
Marsh Instrument Co., Skokie, Ill.

TESTERS, SMOKE

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Marsh Instrument Co., Skokie, Ill.
Victory Engineering Corp., Union, N. J.

THAWERS, PIPE, ELECTRIC, PORTABLE

General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Harold Electric Co., Walla Walla, Wash.
Hobart Bros. Co., Troy, O.
Trindl Products, Ltd., Chicago, Ill.

THERMOMETER WELLS

See Wells, Thermometer

THERMOMETERS, INDICATING, INDUSTRIAL

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Dillon Co., Inc., W. C., Forest Park, Ill.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Electrimatic Co., Sales Affiliate Jas. P. Marsh Corp., Skokie, Ill.
Equipoise Controls, Mount Vernon, N. Y.
Foxboro Co., Foxboro, Mass.
G. M. Mfg. Co., New York, N. Y.
Garden City Instruments, Inc., Chicago, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hill & Co., E. Vernon, Lake Geneva, Ill.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marsh Instrument Co., Skokie, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
Moeller Instrument Co., Richmond Hill, N. Y.
Pacific Transducer Co., Los Angeles, Calif. (for surface temperatures)
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Philadelphia Thermometer Co., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
Rochester Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Div. of American Machine and Metals, Inc., Sellersville, Pa.
Velan Engineering Co., Havertown, Pa.
Weksler Thermometer Corp., New York, N. Y.
West Instrument Corp., Chicago, Ill.
Weston Electrical Instrument Corp., Newark, N. J.
Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.

THERMOMETERS, INDICATING, REMOTE-READING

Bailey Meter Co., Cleveland, O.
Barber-Colman Co., Rockford, Ill.
Beckman & Whitley, Inc., San Carlos, Calif.
Bristol Co., The, Waterbury, Conn.
Defender Instrument & Regulator Co., St. Louis, Mo.
Dickson Co., The, Chicago, Ill.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Electrimatic Co., Sales Affiliate Jas. P. Marsh Corp., Skokie, Ill.
Fee & Stemwedel, Inc., Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
G. M. Mfg. Co., New York, N. Y.
Garden City Instruments, Inc., Chicago, Ill.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marsh Instrument Co., Skokie, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Moore Products Co., Philadelphia, Pa.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Philadelphia Thermometer Co., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
Rochester Mfg. Co., Rochester, N. Y.
Sarco Co., Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Taylor Instrument Companies, Rochester, N. Y.
Thompson Research & Mfg. Co., Davenport, Fla.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Div. of American Machine and Metals, Inc., Sellersville, Pa.
Weksler Themometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.

THERMOMETERS, INDICATING, WALL

Bristol Co., The, Waterbury, Conn.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Electrimatic Co., Sales Affiliate Jas. P. Marsh Corp., Skokie, Ill.
Fee & Stemwedel, Inc., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
G. M. Mfg. Co., New York, N. Y.
Garden City Instruments, Inc., Chicago, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hausman Mfg. & Sales Co., Chicago, Ill. (Indicates both temperature and humidity, showing comfort zone)
Hill & Co., E. Vernon, Lake Geneva, Wis.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Philadelphia Thermometer Co., Philadelphia, Pa.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
Sarco Co., Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Div. of American Machine and Metals, Inc., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y. (Effective temperature indicator)
Weston Electrical Instrument Corp., Newark, N. J.
Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.

THERMOMETERS, KATA

G. M. Mfg. Co., New York, N. Y.
Hill & Co., E. Vernon, Lake Geneva, Wis.
Precision Thermometer & Instrument Co., Philadelphia, Pa.

THERMOSTATIC BELLOWS

See Bellows, Thermostatic and Metallic

THERMOSTATIC BI-METALS

See Bi-Metals, Thermostatic

THERMOSTATIC TRAPS

See Traps, Steam, Thermostatic

THERMOSTATS, DUCT TYPE

American District Telegraph Co., New York, N. Y.
Atlas Valve Co., Newark, N. J.
Au-Temp-Co Corp., New York, N. Y.
Barber-Colman Co., Rockford, Ill.
Burling Instrument Co., South Orange, N. J.
Cam-Stat, Inc., Div. of The Paul Henry Co., Los Angeles, Calif.
Cooper Co., Clark, Palmyra, N. J.
Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
Fenwal Inc., Ashland, Mass.
Johnson Service Co., Milwaukee, Wis.
Leslie Co., Lyndhurst, N. J.
McLarty Systems, Battle Creek, Mich.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Moeller Instrument Co., Richmond Hill, N. Y.
Perfex Corp., Milwaukee, Wis.
Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Scaico, Inc., Palmyra, N. J.
Smith Control & Instrument Corp., Palmyra, N. J.
Stevens Mfg. Co., Inc., Mansfield, O.
United Electric Controls Co., Watertown, Mass.
Vapor Heating Corp., Chicago, Ill.
Wesix Electric Heater Co., San Francisco, Calif.
Wiegand Co., Edwin L., Pittsburgh, Pa.
White-Rodgers Electric Co., St. Louis, Mo.

THERMOSTATS, EFFECTIVE TEMPERATURE

Cooper Co., Clark, Palmyra, N. J.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Sarcotherm Controls, Inc., New York, N. Y.

THERMOSTATS, IMMERSION

Atlas Valve Co., Newark, N. J.
Au-Temp-Co Corp., New York, N. Y.
Barber-Colman Co., Rockford, Ill.
Burling Instrument Co., South Orange, N. J.
Cam-Stat, Inc., Div. of The Paul Henry Co., Los Angeles, Calif.
Cooper Co., Clark, Palmyra, N. J.
Detroit Controls Corp., Detroit, Mich.
Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
Fenwal Inc., Ashland, Mass.
General Controls Co., Glendale, Calif. and Skokie, Ill.
H-B Instrument Co., Philadelphia, Pa.
Hart Mfg. Co., Hartford, Conn.
Industrial Engineering Corp., Terre Haute, Ind.
Iron Fireman Mfg. Co., Cleveland, O.
Johnson Service Co., Milwaukee, Wis.
Leslie Co., Lyndhurst, N. J.
Mechanical Industries Production Co., Akron, O.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Penn Controls, Inc., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Philadelphia Thermometer Co., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Scaico, Inc., Palmyra, N. J.
Smith Control & Instrument Corp., Palmyra, N. J.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
Sullivan Valve & Engineering Co., Butte, Mont.
Superior Controls Co., Inc., Los Angeles, Calif.
Thwing-Albert Instrument Co., Philadelphia, Pa.
United Electric Controls Co., Watertown, Mass.
Vapor Heating Corp., Chicago, Ill.
Vulcan Electric Co., Danvers, Mass.
Wesix Electric Heater Co., San Francisco, Calif.
Westinghouse Electric Corp., Pittsburgh, Pa.
White-Rodgers Electric Co., St. Louis, Mo.
Wiegand Co., Edwin L., Pittsburgh, Pa.
Wilcolator Co., Elizabeth, N. J.

THERMOSTATS, RADIANT HEAT

Detroit Controls Corp., Detroit, Mich.
General Controls Co., Glendale, Calif. and Skokie, Ill.
Iron Fireman Mfg. Co., Cleveland, O.
Mercoid Corp., The, Chicago, Ill.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Thrush & Co., H. A., Peru, Ind.
White-Rodgers Electric Co., St. Louis, Mo.

THERMOSTATS, ROOM OR WALL

A-P Controls Corp., Milwaukee, Wis.
Acro Mfg. Co., The, Columbus, O.
Armstrong Machine Wks., Three Rivers, Mich.
Au-Temp-Co Corp., New York, N. Y.
Barber-Colman Co., Rockford, Ill.
Cam-Stat, Inc., Div. of The Paul Henry Co., Los Angeles, Calif.
Crown Controls Co., Inc., New Bremen, O.
Detroit Controls Corp., Detroit, Mich.
General Controls Co., Glendale, Calif. and Skokie, Ill.
Gleason-Avery, Inc., Auburn, N. Y.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Industrial Engineering Corp., Terre Haute, Ind.
Iron Fireman Mfg. Co., Cleveland, O.
Johnson Service Co., Milwaukee, Wis.
McCorkle Co., D. H., Berkeley, Calif.
McQuay-Norris Mfg. Co., St. Louis, Mo.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Penn Controls, Inc., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Powers Regulator Co., Skokie, Ill.
Roberson Co., L. N., Seattle, Wash.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Soreng Products Corp., Schiller Park, Ill.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Thrush & Co., H. A., Peru, Ind.
Triplex Heating Specialty Co., Inc., Peru, Ind.
United Electric Controls Co., Watertown, Mass.
Vapor Heating Corp., Chicago, Ill.
Wesix Electric Heater Co., San Francisco, Calif.
White-Rodgers Electric Co., St. Louis, Mo.
Wiegand Co., Edwin L., Pittsburgh, Pa.

THERMOSTATS, SURFACE

Au-Temp-Co Corp., New York, N. Y.
Barber-Colman Co., Rockford, Ill.
Cam-Stat, Inc., Div. of The Paul Henry Co., Los Angeles, Calif.
Cooper Co., Clark, Palmyra, N. J.
Detroit Controls Corp., Detroit, Mich.
Fenwal Inc., Ashland, Mass.
General Controls Co., Glendale, Calif. and Skokie, Ill.
Hart Mfg. Co., Hartford, Conn.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Industrial Engineering Corp., Terre Haute, Ind.
Johnson Service Co., Milwaukee, Wis.
McCorkle Co., D. H., Berkeley, Calif.
Mechanical Industries Production Co., Akron, O.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Penn Controls, Inc., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Powers Regulator Co., Skokie, Ill.
Red Spot Electric Co., Tacoma, Wash.
Roberson Co., L. N., Seattle, Wash.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Scaico, Inc., Palmyra, N. J.
Smith Control & Instrument Corp., Palmyra, N. J.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
Stevens Mfg. Co., Inc., Mansfield, O.
Therm-O-Disc, Inc., Mansfield, O.
Triplex Heating Specialty Co., Inc., Peru, Ind.
United Electric Controls Co., Watertown, Mass.
Westinghouse Electric Corp., Pittsburgh, Pa.
White-Rodgers Electric Co., St. Louis, Mo.
Wiegand Co., Edwin L., Pittsburgh, Pa.

THERMOSTATS, TWO TEMPERATURE OR DUAL

Automatic Devices Co., Inc., Western Springs, Ill.
Barber-Colman Co., Rockford, Ill.
Burling Instrument Co., South Orange, N. J.
Detroit Controls Corp., Detroit, Mich.
General Controls Co., Glendale, Calif. and Skokie, Ill.
General Electric Co., Air Conditioning Div., Bloomfield, N. J.
H-B Instrument Co., Philadelphia, Pa.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Industrial Engineering Corp., Terre Haute, Ind.
Iron Fireman Mfg. Co., Cleveland, O.
Johnson Service Co., Milwaukee, Wis.
Mercoid Corp., The, Chicago, Ill.
Miller-Harris Instrument Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Perfex Corp., Milwaukee, Wis.
Powers Regulator Co., Skokie, Ill.
Ranco, Inc., Columbus, O.
Roberson Co., L. N., Seattle, Wash.

Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Soreng Products Corp., Schiller Park, Ill.
United Electric Controls Co., Watertown, Mass.
Vapor Heating Corp., Chicago, Ill.
White-Rodgers Electric Co., St. Louis, Mo.

THERMOSTATS, WEATHER COMPENSATING

Automatic Devices Co., Inc., Western Springs, Ill.
Barber-Colman Co., Rockford, Ill.
Crown Controls Co., Inc., New Bremen, O.
Detroit Controls Corp., Detroit, Mich.
Heat Timer Corp., New York, N. Y.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
McLarty Systems, Battle Creek, Mich.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Tallmadge, Webster, Systems, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
United Electric Controls Co., Watertown, Mass.
Webster & Co., Warren, Camden, N. J.
White-Rodgers Electric Co., St. Louis, Mo.

TIME SWITCHES

See Switches, Time

TOGGLE BOLTS

See Bolts, Toggle and Anchor

TONGS, PIPE

Armstrong Bros. Tool Co., Chicago, Ill.
Billings & Spencer Co., Hartford, Conn.
Williams & Co., J. H., Buffalo, N. Y.

TOOLS (CHISELS, PLIERS, SCREW DRIVERS, ETC.)

Badger Sales Co., Inc., Los Angeles, Calif. (magnifying inspectoscope for inspection of hard-to-get-at places)
Balmar Corp., Baltimore, Md. (disc grinder)
Barton Products, Inc., Wheaton, Ill. (flexible shaft grinding wheel and wire brush)
Billings & Spencer Co., Hartford, Conn.
Birks Mfg. Co., Meriden, Conn. (Pittsburgh lock seam opener)
Bonney Forge & Tool Works, Allentown, Pa.
Boston Machine Works Co., Lynn, Mass. (nozzle extractor)
Carlson & Sullivan, Monrovia, Calif. (steel tape rule for reading diameter)
Churchward Welding Accessories, Jack, North Haven, Conn. (scaling hammer)
Crescent Tool Co., Jamestown, N. Y.
Dreier Brothers, Chicago, Ill. (level for determining pitch of pipe)
Duro Metal Products Co., Chicago, Ill.
Everhot Products Co., Chicago, Ill.
Greene, Tweed & Co., North Wales, Pa.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
Harris, A. R., Hammond, Ind.
Hexdall Co., A. M., Morris, Ill. (Pittsburgh lock hammers, tee hammers, seam openers)
Ingersoll-Rand Co., New York, N. Y.
Interstate Sales Co., New York, N. Y. (Protractor for layout work and center-finder protractor; angle meters for pipe layout)
Lane Shur-Grip Tool Co., Chicago, Ill. (pliers)
Levow, David, New York, N. Y. (3 way clamp)
Lufkin Rule Co., Saginaw, Mich. (steel tapes and folding rules)
Mall Tool Co., Chicago, Ill.
Markal Co., Chicago, Ill. (markers for hot surfaces)
Mid-States Welder Mfg. Co., Chicago, Ill. (heavy duty power saw and file)
Millers Falls Co., Greenfield, Mass.
Milwaukee Electric Tool Corp., Milwaukee, Wis. (portable electric screw drivers and hammers)
Misener Mfg. Co., Inc., Syracuse, N. Y. (Rotary hole saws)
Owens Co., H., Culver City, Calif. (pattern developer tool for sheet metal work)
Peck, Stow & Wilcox Co., Southington, Conn.
Pioneer Tool Co., Racine, Wis.
Producers & Distributors, Inc., Allentown, Pa. (metal saw to attach to electric drill)
R C S Tool Sales Corp., Joliet, Ill. (reciprocating saw attachment; right angle drill attachments)
Ramset Div., Olin Industries, Inc., Cleveland, O. (powder-actuated tools)
Rawlplug Co., Inc.. The, New York, N. Y. (drills for masonry)
Refrigeration Devices Co., Nutley, N. J. (oiler for refrigeration compressors)
Richmont, Inc., Monrovia, Calif.
Rotary Concrete Drill Co., Pasadena, Calif. (Drill bits)
Rotor Tool Co., Cleveland, O.
Salsbury Corp., Los Angeles, Calif. (air hammer)
Schild Mfg. Co., Dallas, Tex.
Snap-on Tools Corp., Kenosha, Wis.
Stanley Works, The, New Britain, Conn.
Thompson & Son Co., The, Henry G., New Haven, Conn.
Wasserlein Mfg. Co., Inc., Joliet, Ill. (soldering pliers for copper tubing)
Williams & Co., J. H., Buffalo, N. Y.

TOOLS, FLARING, FOR TUBING

Armstrong Bros. Tool Co., Chicago, Ill.
Bonney Forge & Tool Works, Allentown, Pa.
Capewell Mfg. Co., Hartford, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Specialty Mfg. Co., Chicago, Ill.
Duro Metal Products Co., Chicago, Ill.
Everhot Products Co., Chicago, Ill.
Flodar Corp., Cleveland, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Key Co., East St. Louis, Ill.
Madden Brass Products Co., Chicago, Ill.
Parker Appliance Co., The, Cleveland, O.
Penn Brass & Copper Co., Erie, Pa.
Sac Tool Mfg. Co., St. Louis, Mo.
Talon Tools, Inc., North Arlington, N. J.
Weatherhead Co., Cleveland, O.
Williams & Co., J. H., Buffalo, N. Y.
Wilson, Inc., Thomas C., Long Island City, N. Y.

TORCHES, BRAZING AND SOLDERING

Aeroil Products Co., Inc., South Hackensack, N. J.
Air Reduction Sales Co., New York, N. Y.
Bernz Co., Otto, Rochester, N. Y.
Borm Mfg. Co., Elgin, Ill.
Clayton & Lambert Mfg. Co., Louisville, Ky.
Dockson Corp., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Ergolyte Mfg. Co., Philadelphia, Pa.
Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
General Scientific Equipment Co., Philadelphia, Pa.
Goss Gas, Inc., Pittsburgh, Pa.
Harris Calorific Co., The, Cleveland, O.
Ideal Industries, Inc., Sycamore, Ill.
Industrial Engineered Products Co., Los Angeles, Calif.
Industrial Gas Div., Liquid Carbonic Corp., Chicago, Ill.
Insto-Gas Corp., Detroit, Mich.
Johnson Gas Appliance Co., Cedar Rapids, Ia.
Lee Co., K. O., Aberdeen, S. D.
Lenk Mfg. Co., Boston, Mass.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Liquid Carbonic Corp., The, Chicago, Ill.
Marquette Mfg. Co., Minneapolis, Minn.
Mass Co., Davenport, Ia.
Mid-States Welder Mfg. Co., Chicago, Ill.
Minn-Kota Foundry & Mfg. Co., Fargo, N. D.
Modern Engineering Co., St. Louis, Mo.
National Cylinder Gas Co., Chicago, Ill.
Polis Mfg. Co., J. D., Chicago, Ill.
Powder Weld Process Co., The, Brooklyn, N. Y.
Prepo Corp., Edgerton, Wis.
Reiner & Campbell Co., Inc., Newark, N. J.
Research Vacuum Supply Co., Chicago, Ill.
Sac Tool Mfg. Co., St. Louis, Mo.
Sight Feed Generator Co., West Alexandria, O.
Smith Welding Equipment Corp., Minneapolis, Minn.
Torit Mfg. Co., St. Paul, Minn.
Trindl Products, Ltd., Chicago, Ill.
Turner Brass Works, The, Sycamore, Ill.
Velocity Power Tool Co., Pittsburgh, Pa.
Victor Equipment Co., Welding Equipment Div., San Francisco, Calif.
Will-Weld Mfg. Co., Inc., Omaha, Neb.

TORQUE INDICATING WRENCHES

See Wrenches, Torque Indicating

TOWERS, COOLING, ATMOSPHERIC

American Cooling Tower Co., Kansas City, Mo.
Binks Mfg. Co., Chicago, Ill.
Dover Mfg. Co., Independence, Mo.
Economy Pumps Inc., Div. of Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Fluor Corp., Ltd., The, Los Angeles, Calif.
Harry Cooling Towers, Inc., New York, N. J.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Lilie-Hoffmann Cooling Towers, Inc., St. Louis, Mo.
Marley Co., Inc., Kansas City, Mo.
New England Cooling Tower Co., Boston, Mass.
Pennsylvania Engineering Wks., New Castle, Pa.
Phillips Cooling Tower Co., Inc., Brooklyn, N. Y.
Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Santa Fe Tank & Tower Co., Los Angeles, Calif.
Santa Fe Tank & Tower Co., Garland, Tex.
Stewart Ice Machine Co., Pomona, Calif.
United Cooling Tower Co., Kansas City, Mo.
Water Cooling Corp., New York, N. Y.
Water Cooling Equipment Co., St. Louis, Mo.
Water Cooling Tower Co., Chicago, Ill.

TOWERS, COOLING, MECHANICAL DRAFT

Acme Equipment Co., Muskogee, Okla.
Acme Industries, Inc., Jackson, Mich.
Air & Refrigeration Corp., New York, N. Y.
American Cooling Tower Co., Kansas City, Mo
Aqua-Therm, Inc., Dayton, O.
Baltimore Aircoil Co., Inc., Baltimore, Md.
Beck Mfg. Co., New Albany, Ind.
Binks Mfg. Co., Chicago, Ill.
Buensod-Stacey, Inc., New York, N. Y.
Bush Mfg. Co., West Hartford, Conn.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Crowell & Dunn, Inc., New York, N. Y.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis Mo
Drayer-Hanson, Inc., Los Angeles, Calif.
Dover Mfg. Co., Independence, Mo.
Economy Pumps Inc., Div. of Wheeler Mfg Co., C. H., Philadelphia, Pa.
Fluor Corp., Ltd., The, Los Angeles, Calif.
Foster Wheeler Corp., New York, N. Y.
Goodfellow Co., Inc., E. D., Memphis, Tenn.
Governair Corp., Oklahoma City, Okla.
Halstead & Mitchell, Pittsburgh, Pa.
Harry Cooling Towers, Inc., New York, N. Y.
Havens Structural Steel Co., Kansas City, Mo.
Hydrocol-Air-Sanitation, Inc., New York, N. Y.
Imsco Mfg. Co., Dallas, Tex.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kennard Corp., St. Louis, Mo.
Kramer-Trenton Co., Trenton, N. J.
Lakewood Engineering & Mfg. Co., Chicago, Ill.
Larkin Coils, Inc., Atlanta, Ga.
Lilie-Hoffmann Cooling Towers, Inc., St. Louis, Mo.
Marley Co., Inc., Kansas City, Mo.
Marlo Coil Co., St. Louis, Mo.
McIntyre Engineering Co., Inc., South San Francisco, Calif.
McQuay, Inc., Minneapolis, Minn.
New England Cooling Tower Co., Boston, Mass.
Pennsylvania Engineering Wks., New Castle, Pa.
Phillips Cooling Tower Co., Inc., Brooklyn, N. Y.
Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Reco Products Div., Recony Corp., New York, N. Y.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Santa Fe Tank & Tower Co. of Texas, Garland, Tex.
Santa Fe Tank & Tower Co., Los Angeles, Calif.
Servel, Inc., Evansville, Ind.
Silco Products, Inc., Minneapolis, Minn.
Super-Cold Corp., Los Angeles, Calif.
Tenney Engineering, Inc., Newark, N. J.
Trane Co., The, LaCrosse, Wis.
Union Asbestos & Rubber Co., Chicago, Ill.
United Cooling Tower Co., Kansas City, Mo.
United States Air Conditioning Corp., Minneapolis, Minn.
Vogt Machine Co., Henry, Louisville, Ky. (packaged unit with condenser, pump, etc.)
Water Cooling Corp., New York, N. Y.
Water Cooling Equipment Co., St. Louis, Mo.
Water Cooling Tower Co., Chicago, Ill.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.

TOWERS, COOLING, NOISE ELIMINATION FOR

See Noise Elimination for Cooling Towers

TRANSFORMERS, ELECTRIC

Acme Electric Corp., Cuba, N. Y.
Arjac Products Inc., Rochester, N. Y.
Birdsell Mfg. Co., Inc., Palo Alto, Calif.
Crown Controls Co., Inc., New Bremen, O.
Dormeyer Industries, Chicago, Ill.
Eisler Engineering Co., Inc., Newark, N. J.
Essex Wire Corp., Ft. Wayne, Ind.
Fluid Systems, Inc., New Haven, Conn.
General Controls Co., Glendale, Calif., and Skokie, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hampton Electric Mfg. Co., Pittsburgh, Pa.
Hindle Transformer Co., Inc., Flemington, N. J.
Jefferson Electric Co., Bellwood, Ill.
Magnex Corp., Jamaica, N. Y. (oil burner ignition)
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Rex Welder & Engineering Co., Kansas City, Mo.
Sola Electric Co., Chicago, Ill. (voltage regulating)
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Taylor-Winfield Corp., Warren, O.
Trindl Products, Ltd., Chicago, Ill.
Union Electric & Mfg. Co., Jersey City, N. J.
Wagner Electric Corp., St. Louis, Mo.
Webster Electric Co., Racine, Wis.
Westinghouse Electric Corp., Pittsburgh, Pa.

TRANSMISSION DRIVES

See Drives, Chain, Flat Belt and V-Belt

TRANSMITTERS, PRESSURE AND TEMPERATURE

Bristol Co., The, Waterbury, Conn.
Cooper Co., Clark, Palmyra, Pa.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Taylor Instrument Companies, Rochester, N. Y.

TRAPS, MAGNETIC, FOR REMOVING TRAMP IRON FROM PIPE LINES

Columbia Engineering Service Co., Santa Rosa, Calif.
Dings Magnetic Separator Co., Milwaukee, Wis.

TRAPS, STEAM, FLOAT-THERMOSTATIC

American District Steam Co., Inc., North Tonawanda, N. Y.
Bailey Co., Chas. M., San Francisco, Calif.
Barnes & Jones, Inc., Jamaica Plain, Boston, Mass.
Davis Regulator Co., Chicago, Ill.
Dunham Co., C. A., Chicago, Ill.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Marsh Heating Equipment Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Sterling, Inc., Milwaukee, Wis.
Webster & Co., Warren, Camden, N. J.

TRAPS, STEAM, MECHANICAL

Acker Organization, Inc., W. M., Cleveland, O.
American District Steam Co., Inc., North Tonawanda, N. Y.
Anderson Co., V. D., The, Cleveland, O.
Armstrong Machine Wks., Three Rivers, Mich.
Bailey Co., Chas. M., San Francisco, Calif.
Barnes & Jones, Inc., Boston, Mass.
Bishop & Babcock Mfg. Co., Cleveland, O.
Boylston Steam Specialty Co., Chicago, Ill.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Burrows Mfg. Co., F. A. York, Pa.
Cashin Co., W. D., Boston, Mass.
Clark Mfg. Co., Cleveland, O.
Coe Mfg. Co., Painesville, O.
Crane Co., Chicago, Ill.
Cryer Trap & Valve Div., Encor Corp., Belleville, N. J.
Davis Engineering Corp., Elizabeth, N. J.
Ellis Drier Co., Chicago, Ill.
Fisher Governor Co., Marshalltown, Ia.
Haines & Co., Inc., William S., Div. Sellers Injector Corp., Philadelphia, Pa.
Healy Ruff Co., St. Paul, Minn.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Johnson Corp., The, Three Rivers, Mich.
Justus Steam Trap Co., Napanoch, N. Y.
Kaye & MacDonald, Inc., West Orange, N. J.
Keckley Co., O. C., Chicago, Ill.
Leavitt Machine Co., Orange, Mass.
Marsh Heating Equipment Co., Skokie, Ill.
McAlear Mfg. Co., Chicago, Ill.
McAuley Trap Co., Pittsburgh, Pa.
Milwaukee Valve Co., Milwaukee, Wis.
Monash-Younker Co., Inc., Chicago, Ill.
Morehead Mfg. Co., Detroit, Mich.
Nason Co., Clarkston, Mich.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Rockwell Co., W. S., Fairfield, Conn.
Sarco Co., Inc., New York, N. Y.
Schaub Engineering Co., Fred H., Chicago, Ill.
Squires Co., C. E., Cleveland, O.
Sterling Engineering & Mfg. Corp., Hyde Park, Mass.
Sterling, Inc., Milwaukee, Wis.
Stickle Steam Specialties Co., Indianapolis, Ind.
Strong, Carlisle & Hammond Co., Cleveland, O.
Templeton Bros., Hyde Park, Mass.
Trane Co., The, LaCrosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.
Velan Engineering Co., Jersey City, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Williams Gauge Co., The, Pittsburgh, Pa.
Wright-Austin Co., Detroit, Mich.
Yarnall-Waring Co., Philadelphia, Pa.

TRAPS, STEAM, THERMOSTATIC

American District Steam Co., Inc., North Tonawanda, N. Y.
Barnes & Jones, Inc., Boston, Mass.
Bishop & Babcock Mfg. Co., Cleveland, O.
Cashin Co., W. D., Boston, Mass.
Cryer Trap & Valve Div., Encor Corp., Belleville, N. J.
Dunham Co., C. A., Chicago, Ill.
Haines & Co., Inc., William S., Div. Sellers Injector Corp., Philadelphia, Pa.

Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Marsh Heating Equipment Co., Skokie, Ill.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Monash-Younker Co., Inc., Chicago, Ill.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Simplex Heating Specialty Co., Inc., Lynchburg, Va.
Squires Co., C. E., The, Cleveland, O.
Sterling Engineering & Mfg. Corp., Hyde Park, Mass.
Sterling, Inc., Milwaukee, Wis.
Templeton Bros., Hyde Park, Mass.
Trane Co., The, LaCrosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.
Velan Engineering Co., Jersey City, N. J.
Webster & Co., Warren, Camden, N. J.

TREATMENT, FUEL OIL, TO PREVENT SLUDGE

Allen Co., Robert G., Mechanicsville, N. Y.
Alrose Chemical Co., Providence, R. I.
American Sand-Banum Co., Inc., New York, N. Y.
Ampion Corp., Long Island City, N. Y.
Anderson-Stolz Corp., Kansas City, Mo.
Bird-Archer Co., Philadelphia, Pa.
Black & White Chemical Co., New York, N. Y.
Celco Corp., New York, N. Y.
Eds-Wil Burner Corp., Chicago, Ill.
Elraco Engineering Co., Los Angeles, Calif.
Hercules Chemical Co., Inc., New York, N. Y.
Madden Corp., The, Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
National Airoil Burner Co., Inc., Philadelphia, Pa.
National Aluminate Corp., Chicago, Ill.
North American Mogul Products Co., The, Cleveland, O.
O'Brien Industries, Caldwell, N. J.
% Proportioneers, Inc. %, Providence, R. I.
Perolin Co., Inc., Chicago, Ill.
Radiator Specialty Co., Charlotte, N. C.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Utility Laboratory, Inc., Brooklyn, N. Y.
Warren Refining & Chemical Co., The, Cleveland, O.
Western Chemical Co., Kansas City, Mo.

TREATMENT, STEAM SYSTEM, TO INHIBIT CORROSION

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Water Softener Co., Philadelphia, Pa.
American Well Wks., Aurora, Ill.
Ampion Corp., Long Island City, N. Y.
Anderson-Stolz Corp., Kansas City, Mo.
Apex All Weather Products, Chicago, Ill.
Aqua Electric Scale Control, Inc., Cleveland, O.
Aquatrol Laboratories, Inc., Clifton, N. J.
Bird-Archer Co., Philadelphia, Pa.
Brown Electro Co., Oklahoma City, Okla.
Calgon, Inc., Pittsburgh, Pa.
Cannon Chemical Co., Inc., Cambridge, Mass.
Carbide and Carbon Chemicals Div., Carbide & Carbon Corp., New York, N. Y.
Chemical Engineering Co., Dallas, Tex.
Chemical Solvent Co., Birmingham, Ala.
Cochrane Corp., Philadelphia, Pa.
Continental Products Co., Euclid, O.
Dearborn Chemical Co., Chicago, Ill.
Elgin Softener Corp., Elgin, Ill.
Graver Water Conditioning Co., New York, N. Y.
Hagan Corp., Pittsburgh, Pa.
Haering & Co., Inc., D. W., San Antonio, Tex.
Hercules Chemical Co., Inc., New York, N. Y.
Kenite Laboratory, Inc., Madison, N. J.
Madden Corp., The, Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.
McRay Sales Co., South Pasadena, Calif.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Milton Roy Co., Philadelphia, Pa.
National Aluminate Corp., Chicago, Ill.
North American Mogul Products Co., The, Cleveland, O.
O'Brien Industries, Caldwell, N. J.
Perolin Co., Inc., Chicago, Ill.
% Proportioneers, Inc. %, Providence, R. I.
Rid-Sludge Div., Aulwood Mfg. Co., St. Paul Minn. (vapor treatment to remove sludge from heating system)
Saverite Engineering Co., Hoboken, N. J.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Strong, Carlisle & Hammond Co., Cleveland, O.
Sulflo, Inc., Elizabeth, N. J.
Turco Products, Inc., Los Angeles, Calif.
Utility Laboratory, Inc., Brooklyn 32, N. Y.
Vinco Co., Inc., The, New York, N. Y.
Warren Refining & Chemical Co., Cleveland, O.

Water Control Engineering Co., Kansas City, Mo.
Water Treatment Co. of America, Pittsburgh, Pa.
Western Chemical Co., Kansas City, Mo.
X Laboratories, Inc., New York, N. Y.

TREATMENT, WATER, TO INHIBIT CORROSION

Agava Products, Inc., Jersey City, N. J.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Cyanamid & Chemical Corp., New York, N. Y.
American K. A. T. Corp., Garwood, N. J.
American Sand-Banum Co., Inc., New York, N. Y.
American Water Softener Co., Philadelphia, Pa.
American Well Works, Aurora, Ill.
Ampion Corp., Long Island City, N. Y.
Anderson-Stolz Corp., Kansas City, Mo.
Aqua Electric Scale Control, Inc., Cleveland, O.
Aquatrol Laboratories, Inc., Clifton, N. J.
Bird-Archer Co., Philadelphia, Pa.
Brown Electro Co., Oklahoma City, Okla.
Calgon, Inc., Pittsburgh, Pa.
Cannon Chemical Co., Inc., Cambridge, Mass.
Carbide and Carbon Chemicals Div., Carbide & Carbon Corp., New York, N. Y.
Chemical Engineering Co., Dallas, Tex.
Chemical & Metallurgical Products, Inc., New York, N. Y.
Chemical Solvent Co., Birmingham, Ala.
Cochrane Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Culligan Inc., Northbrook, Ill.
Dearborn Chemical Co., Chicago, Ill.
Drew & Co., Inc., E. F., New York, N. Y.
Elgin-Refinite, Div. of Elgin Softener Corp., Elgin, Ill.
Elgin Softener Corp., Elgin, Ill.
Evis Mfg. Co., San Francisco, Calif.
Ferro-Nil Corp., New York, N. Y.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
Fischer & Porter Co., Hatboro, Pa.
General Filter Co., Ames, Ia.
Graver Water Conditioning Co., New York, N. Y.
Grief, Edward C., Bogota, N. J.
Haering & Co., Inc., D. W., San Antonio, Tex.
Hagan Corp., Pittsburgh, Pa.
Hungerford & Terry, Inc., Clayton, N. J.
Layne & Bowler, Inc., Memphis, Tenn.
Madden Corp., The, Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.
Maintenance Engineering Corp., Houston, Tex.
McRay Sales Co., South Pasadena, Calif.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Milton Roy Co., Philadelphia, Pa.
Monsanto Chemical Co., St. Louis, Mo.
Moreheat Distribution, Inc., Cincinnati, O.
National Aluminate Corp., Chicago, Ill.
North American Mogul Products Co., The, Cleveland, O.
O'Brien Industries, Caldwell, N. J.
%Proportioneers, Inc., %, Providence, R. I.
Permutit Co., New York, N. Y.
Perolin Co., Inc., Chicago, Ill.
Research Products Corp., Madison, Wis.
Rodwell Engineering & Sales Co., Omaha, Neb.
Saverite Engineering Co., Hoboken, N. J.
Schror, Dr. Adolph, East Orange, N. J.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Strong, Carlisle & Hammond Co., Cleveland, O.
Sudbury Laboratory, South Sudbury, Mass.
Sulflo, Inc., Elizabeth, N. J.
Turco Products, Inc., Los Angeles, Calif.
Uniflow Mfg. Co., Erie, Pa.
Vinco Co., Inc., The, New York, N. Y.
Wallace & Tiernan Co., Inc., Newark, N. J.
Warlo Corp., New York, N. Y.
Water Control Engineering Co., Kansas City, Mo.
Water Refining Co., Ft. Wayne, Ind.
Water Service Laboratories, Inc., New York, N. Y.
Water Treatment Company of America, Pittsburgh, Pa.
Western Chemical Co., Kansas City, Mo.
Worthington Corp., Harrison, N. J.
X Laboratories, Inc., New York, N. Y.

TREATMENT, WATER, FOR SLIME AND ALGAE CONTROL

Agava Products Inc., Jersey City, N. J.
Alrose Chemical Co., Providence, R. I.
American Water Softener Co., Philadelphia, Pa.
American Well Works, Aurora, Ill.
Ampion Corp., Long Island City, N. Y.
Anderson-Stolz Corp., Kansas City, Mo.
Aqua Electric Scale Control, Inc., Cleveland, O.
Aquatrol Laboratories, Inc., Clifton, N. J.
Bird-Archer Co., Philadelphia, Pa.
Brown Electro Co., Oklahoma City, Okla.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Carbide and Carbon Chemicals Div., Union Carbide and Carbon Corp., New York, N. Y.
Carolina Aniline & Extract Co., Charlotte, N. C.
Chemical Engineering Co., Dallas, Tex.
Chemical Solvent Co., Birmingham, Ala.

Cooper Co., Clark, Palmyra, N. J.
Dearborn Chemical Co., Chicago, Ill.
Dow Chemical Co., The, Midland, Mich.
Drew & Co., Inc., E. F., New York, N. Y.
Elgin-Refinite, Div. of Elgin Softener Corp., Elgin, Ill.
Evis Mfg. Co., San Francisco, Calif.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
Fischer & Porter Co., Hatboro, Pa.
General Filter Co., Ames, Ia.
General Ozone Corp., Chicago, Ill.
Graver Water Conditioning Co., New York, N. Y.
Haering & Co., Inc., D. W., San Antonio, Tex.
Hagan Corp., Pittsburgh, Pa.
Hungerford & Terry, Inc., Clayton, N. J.
Layne & Bowler, Inc., Memphis, Tenn.
Madden Corp., The, Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.
McRay Sales Co., South Pasadena, Calif.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Milton Roy Co., Philadelphia, Pa.
Monsanto Chemical Co., St. Louis, Mo.
National Aluminate Corp., Chicago, Ill.
North American Mogul Products Co., The, Cleveland, O.
Norwood Associated Engineers Inc., Springfield, Mass.
Oakite Products. Inc., New York, N. Y.
O'Brien Industries, Caldwell, N. J.
Perolin Co., Inc., Chicago, Ill.
% Proportioneers, Inc., %, Providence, R. I.
Permutit Co., New York, N. Y.
Sherwood Water Treatment Co., Inc., Beverly, N. J.
Solvay Process Div., Allied Chemical & Dye Corp., New York, N. Y.
Steelcote Mfg. Co., St. Louis, Mo.
Wallace & Tiernan Co., Inc., Newark, N. J.
Water Treatment Co. of America, Pittsburgh, Pa.
Western Chemical Co., Kansas City, Mo.

TRY-COCKS, BOILER

Chicago Specialty Mfg. Co., Chicago, Ill.
Crane Co., Chicago, Ill.
Detroit Brass & Malleable Works, Detroit, Mich.
Diamond Power Specialty Corp., Lancaster, O.
Eclipse Fuel Engineering Co., Rockford, Ill.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Keckley Co., O. C., Chicago, Ill.
Penberthy Injector Co., Detroit, Mich.
Reliance Gauge Column Co., Cleveland, O.
Robert Mfg. Co., Los Angeles, Calif.
Superior Controls Co., Inc., Los Angeles, Calif.

TUBE CLEANERS

See Cleaners, Tube

TUBE FINNING MACHINES

See Machines, Tube Finning

TUBES, BOILER

Babcock & Wilcox Co., The, Tubular Products Div., Alliance, O.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Globe Steel Tubes Co., Milwaukee, Wis.
H & H Tube & Mfg. Co., Detroit, Mich.
National Tube Div., United States Steel Corp., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Standard Tube Co., Detroit, Mich.
Trent Tube Co., East Troy, Wis. (stainless)
Wolverine Tube Div., Calumet and Hecla, Inc., Detroit, Mich.

TUBES, CONDENSER

American Brass Co., Waterbury, Conn.
Babcock & Wilcox Co., The, Tubular Products Div., Alliance, O.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Bridgeport Brass Co., Bridgeport, Conn.
Bundy Tubing Co., Detroit, Mich.
Chase Brass & Copper Co., Waterbury, Conn.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Globe Steel Tubes Co., Milwaukee, Wis.
Helical Tube Corp., East Orange, N. J.
National Tube Div., United States Steel Corp., Pittsburgh, Pa.
Pacific Tube Co., Los Angeles, Calif.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Revere Copper and Brass Incorporated, New York, N. Y.
Reynolds Metals Co., Louisville, Ky.
Scovill Mfg. Co., Waterville Div., Waterville, Conn. (copper base)
Standard Tube Co., Detroit, Mich.
Timken Roller Bearing Co., Canton, O.
Trent Tube Co., East Troy, Wis. (stainless)
Warren Foundry & Pipe Corp., New York, N. Y.
Wolverine Tube Div., Calumet & Hecla, Inc., Detroit, Mich.
York Corp., York, Pa.

TUBES, PITOT

Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Hill & Co., E. Vernon, Lake Geneva, Wis.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Meriam Instrument Co., The, Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.

TUBING, ALUMINUM

Aluminum Co. of America, Pittsburgh, Pa.
American Brass Co., Waterbury, Conn.
Colonial Alloys Co., Metals Div., Philadelphia, Pa.
Kaiser Aluminum & Chemical Corp., Oakland, Calif.
Penn Brass & Copper Co., Erie, Pa.
Revere Copper and Brass Incorporated, New York, N. Y.
Reynolds Metals Co., Louisville, Ky.
Shenango Agaloy Tube Co., Agaloy Tubing Div., Springfield, O.
Viking Copper Tube Co., Cleveland, O.
Wolverine Tube Div., Calumet & Hecla, Inc., Detroit, Mich.

TUBING BENDERS

See Benders, Tubing

TUBING, BRASS AND COPPER

American Brass Co., Waterbury, Conn. (copper/steel admiralty/steel)
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Colonial Alloys Co., Metals Div., Philadelphia, Pa.
Everhot Products Co., Chicago, Ill.
H & H Tube & Mfg. Co., Detroit, Mich.
Helical Tube Corp., East Orange, N. J.
Hussey & Co., C. G., Div. Copper Range Co., Pittsburgh, Pa.
Keeney Mfg. Co., Newington, Conn. (Chrome plated)
Kensico Tube Co., Mt. Kisco, N. Y.
Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
Mueller Brass Co., Port Huron, Mich.
Penn Brass & Copper Co., Erie, Pa.
Phelps Dodge Copper Products Corp., British American Tube Div., New York, N. Y.
Reading Tube Corp., Long Island City, N. Y.
Revere Copper and Brass Incorporated, New York, N. Y.
Roberts Tube Works, Detroit, Mich.
Triangle Conduit & Cable Co., Inc., New Brunswick, N. J.
Viking Copper Tube Co., Cleveland, O.
Wolverine Tube Div., Calumet and Hecla, Inc., Detroit, Mich.

TUBING, BRONZE

American Brass Co., Waterbury, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Colonial Alloys Co., Metals Div., Philadelphia, Pa.
Helical Tube Corp., East Orange, N. J.
Revere Copper and Brass, Incorporated, New York, N. Y.

TUBING, CAPILLARY

Kenmore Machine Products, Inc., Lyons, N. Y.
Revere Copper & Brass, Inc., New York, N. Y.
Superior Tube Co., Norristown, Pa.
Wabash Mfg. Co., Chicago, Ill.
Wolverine Tube Div., Calumet & Hecla, Inc., Detroit, Mich.

TUBING CUTTERS

See Cutters, Tubing

TUBING, DUPLEX

American Brass Co., Waterbury, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
Pacific Tube Co., Los Angeles, Calif. (Non-ferrous to ferrous)
Republic Steel Corp., Steel & Tubes Div., Cleveland, O. (Steel and copper)

TUBING, FINNED

Aerofin Corp., Syracuse, N. Y.
American Coils Co., Newark, N. J.
Brown Fintube Co., The, Elyria, O.
Bush Mfg. Co. West Harford, Conn.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Edwards Engineering Corp., Pompton Plains, N. J.
G. & O. Mfg. Co., New Haven, Conn.
Griscom-Russell Co., The, Massillon, O.
Heatron, Inc., York, Pa.
Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Industrial Mfg. & Engineering Co., Chicago, Ill.

Kramer Trenton Co., Trenton, N. J.
McCord Corp., Detroit, Mich.
Merchant & Evans Co., Philadelphia, Pa.
Peerless of America, Inc., Chicago, Ill.
Quaid Fabrications, Inc., Philadelphia, Pa.
Refrigeration Economics Co., Inc., Canton, O.
Rempe Co., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Tenney Engineering, Inc., Newark, N. J.
Thermek Sales Co., Whitewater, Wis. (spined)
Vapor Heating Corp., Chicago, Ill.
Wolverine Tube Div., Calumet and Hecla, Inc., Detroit, Mich. (Aluminum, copper)

TUBING, MAGNESIUM

Dow Chemical Co., The, Midland, Mich.

TUBING, METAL, FLEXIBLE

American Metal Hose Branch, American Brass Co., The, Waterbury, Conn.
Atlantic Metal Hose Co., Inc., New York, N. Y.
Johnson Metal Hose, Inc., Waterbury, Conn.
Marquette Coppersmithing Co., Philadelphia, Pa.
National Lead Co., New York, N. Y.
Packless Metal Hose, Inc., New Rochelle, N. Y.

TUBING, NICKEL AND NICKEL ALLOY

Agaloy Tubing Co., Springfield, O.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Bridgeport Brass Co., Bridgeport, Conn.
Bundy Tubing Co., Detroit, Mich.
Chase Brass & Copper Co., Waterbury, Conn.
Electric Steel Foundry Co., Portland, Ore.
Globe Steel Tubes Co., Milwaukee, Wis.
Helical Tube Corp., East Orange, N. J.
International Nickel Co., Inc., The, New York, N. Y.
National Tube Div., United States Steel Corp., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Revere Copper and Brass Incorporated, New York, N. Y.
Trent Tube Co., East Troy, Wis.
Wolverine Tube Div., Calumet and Hecla, Inc., Detroit, Mich.

TUBING, PLASTIC

Acadia Synthetic Products Div., Western Felt Works, Chicago, Ill.
Alpha Plastics, Inc., W. Orange, N. J.
American Agile Corp., Bedford, O.
American Hard Rubber Co., New York, N. Y.
Bolta Products, Inc., Lawrence, Mass.
Carlon Products Corp., Cleveland, O.
Commercial Plastics Co., Chicago, Ill.
Continental-Diamond Fibre Co., Newark, Del.
Extruded Plastics, Inc., Norwalk, Conn.
Flexible Tubing Corp., Guilford, Conn.
Flexrock Co., Philadelphia, Pa.
Gates Rubber Co., The, Denver, Colo.
General Ceramics & Steatite Corp., Keasbey, N. J.
General Electric Co., Chemical Div., Pittsfield, Mass.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Hamilton Rubber Mfg. Corp., Trenton, N. J.
Hartwell & Son, Inc., H. N., Boston, Mass.
Haveg Corp., Newark, Del.
Hudson Industries, Inc., Detroit, Mich.
Irvington Varnish and Insulator Div. of Minnesota Mining & Mfg. Co., Irvington, N. J.
Manufacturers Corp., Mansfield, O.
Mills Corp., Elmer E., Chicago, Ill.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Panelyte Div., St. Regis Paper Co., New York, N. Y.
Reflin Co., Gardena, Calif.
Resistoflex Corp., Belleville, N. J.
Richland Co., Mansfield, O.
Sandee Mfg. Co., Chicago, Ill.
Saran Lined Pipe Co., Ferndale, Mich.
Skyline Industries, Titusville, Pa.
Superior Tube Co., Norristown, Pa.
Triangle Conduit & Cable Co., Inc., New Brunswick, N. J.
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.
Vanton Pump & Equipment Corp., New York, N. Y.
Yardley Plastics Co., Columbus, O.

TUBING, SILVER CLAD AND SILVER ALLOY

Baker & Co., Inc., Newark, N. J.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.

TUBING, STEEL, ALLOY, SEAMLESS

Agaloy Tubing Co., Springfield, O.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Globe Steel Tubes Co., Milwaukee, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
National Tube Div., United States Steel Corp., Pittsburgh, Pa.
Pacific Tube Co., Los Angeles, Calif.
Pittsburgh Steel Co., Pittsburgh, Pa.
Shenango Agaloy Tube Co., Agaloy Tubing Div., Springfield, O.
Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Superior Tube Co., Norristown, Pa.
Timken Roller Bearing Co., Canton, O.
Trent Tube Co., East Troy, Wis.
Tube Reducing Corp., Wallington, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

TUBING, STEEL, ALLOY, WELDED

Agaloy Tubing Co., Springfield, O.
Babcock & Wilcox Co., The, Beaver Falls, Pa.
Duraloy Co., Scottdale, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Laclede Steel Co., St. Louis, Mo.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Shenango Agaloy Tube Co., Agaloy Tubing Div., Springfield, O.
Standard Tube Co., Detroit, Mich.
Trent Tube Co., East Troy, Wis.
Youngstown Sheet & Tube Co., Youngstown, O.

TUBING, STEEL, BRAZED

Bundy Tubing Co., Detroit, Mich.
Rochester Products, Div. of General Motors, Rochester, N. Y.
Shenango Agaloy Tube Co., Agaloy Tubing Div., Springfield, O.

TUBING, STEEL, SEAMLESS

Agaloy Tubing Co., Springfield, O.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Everhot Products Co., Chicago, Ill.
Globe Steel Tubes Co., Milwaukee, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
National Tube Div., United States Steel Corp., Pittsburgh, Pa.
Pacific Tube Co., Los Angeles, Calif.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, O.
Shenango Agaloy Tube Co., Agaloy Tubing Div., Springfield, O.
Shenango Agaloy Tube Co., Sharon, Pa.
Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Superior Tube Co., Norristown, Pa.
Trent Tube Co., East Troy, Wis.
Timken Roller Bearing Co., Canton, O.
Youngstown Welding & Engrg., Youngstown, O.
Youngstown Sheet & Tube Co., Youngstown, O.

TUBING, STEEL, STAINLESS

Agaloy Tubing Co., Springfield, O.
Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Carpenter Steel Co., Alloy Tube Div., Union, N. J.
Crucible Steel Co. of America, Pittsburgh, Pa.
Electric Steel Foundry Co., Portland, Ore.
Globe Steel Tubes Co., Milwaukee, Wis.
Helical Tube Corp., East Orange, N. J.
National Tube Div., United States Steel Corp., Pittsburgh, Pa.
Pacific Tube Co., Los Angeles, Calif.
Pypon Co., Pittsburgh, Pa.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Shenango Agaloy Tube Co., Agaloy Tubing Div., Springfield, O.
Standard Tube Co., Detroit, Mich.
Superior Tube Co., Norristown, Pa.
Timken Roller Bearing Co., Canton, O.
Trent Tube Co., East Troy, Wis.
Tri-Clover Machine Co., Kenosha, Wis.
Tube Reducing Corp., Wallington, N. J.

TUBING, STEEL, WELDED

Agaloy Tubing Co., Springfield, O.
Armco Steel Corp., Middletown, O.
Avon Tube Div., Higbe Mfg. Co., Rochester, Mich.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Babcock & Wilcox Tube Co., The, Tubular Products Div., Alliance, O.
Bundy Tubing Co., Detroit, Mich.
Everhot Products Co., Chicago, Ill.
Globe Steel Tubes Co., Milwaukee, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Laclede Steel Co., St. Louis, Mo.
National Tube Div., United States Steel Corp., Pittsburgh, Pa.
Nikoh Tube Co., Chicago, Ill.
Pacific Tube Co., Los Angeles, Calif.
Pittsburgh Tube Co., Pittsburgh, Pa.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Revere Copper and Brass Incorporated, New York, N. Y.
Rochester Products Div., Rochester, N. Y.
Sharon Steel Corp., Sharon, Pa.
Shenango Agaloy Tube Co., Agaloy Tubing Div., Springfield, O.
South Chester Tube Co., Chester, Pa.
Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.

Standard Tube Co., Detroit, Mich.
Thermapanels, Inc., Santa Clara, Calif.
Trent Tube Co., East Troy, Wis.
Wheatland Tube Co., Philadelphia, Pa.
Wolverine Tube Div., Calumet & Hecla, Inc., Detroit, Mich.
Youngstown Sheet & Tube Co., Youngstown, O.

TUBING, TITANIUM

Carpenter Steel Co., Alloy Tube Div., Union, N. J.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Superior Tube Co., Norristown, Pa.
Trent Tube Co., East Troy, Wis.

TURBINES, MECHANICAL DRIVE

Carling Turbine Blower Co., Worcester, Mass.
Coppus Engineering Corp., Worcester, Mass.
Dean Hill Pump Co., Indianapolis, Ind.
De Laval Steam Turbine Co., Trenton, N. J.
Elliott Co., Jeannette, Pa.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Murray Iron Wks. Co., Burlington, Ia.
Pyle-National Co., The, Chicago, Ill.
Steam Turbine Div., Worthington Pump and Machinery Corp., Wellesville, N. J.
Terry Steam Turbine Co., Hartford, Conn.
Westinghouse Electric Corp., Pittsburgh, Pa.
Whiton Machine Co., New London, Conn.
Wing Mfg. Co., L. J., Linden, N. J.

2, 3 AND 4-WAY VALVES

See Valves, 2, 3 and 4-way

ULTRASONIC DUST AND FUME COLLECTION

See Collection, Dust and Fume, Ultrasonic

UNDERGROUND PIPING

See Conduit, Underground Piping

UNDERWATER HEATERS

See Heaters, Steam Jet, for Liquids

UNIONS, BRASS

Acheson Mfg. Co., Rankin, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Gilbert Brass Foundry Co., St. Louis, Mo.
Grabler Mfg. Co., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Mfg. Co., Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
King Union Co., Inc., Hillsgrove, R. I.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Phoenix Brass Fittings Corp., Irvington, N. J.
Powell Co., Wm., Cincinnati, O.
Rhode Island Fittings Co., Providence, R. I.
Union Metal Works, Chelsea, Mass.
Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Weatherhead Co., The, Cleveland, O.

UNIONS, INSULATING

See Joints, Pipe, Electrical Insulating

UNIONS, MALLEABLE, BRASS SEAT

Beaton & Corbin Mfg. Co., Southington, Conn.
Corley Co., Inc., The, Jersey City, N. J.
Crane Co., Chicago, Ill.
Dart Union Co., Providence, R. I.
Das Div. of The Zeller Corp., Defiance, O.
Detroit Brass & Malleable Wks., Detroit, Mich.
Fairbanks Co., The, New York, N. Y.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
General Fittings Co., Providence, R. I.
Grabler Mfg. Co., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Jefferson Union Co., Inc., New York, N. Y.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
King Union Co., Inc., Hillsgrove, R. I.
Malleable Iron Fittings Co., Branford, Conn.
Pacific Fittings Div., General Metals Corp., Hollydale, Calif.
Rhode Island Fittings Co., Providence, R. I.
Rockwood Sprinkler Co., Worcester, Mass.
Stockham Valves & Fittings, Birmingham, Ala.
Union Malleable Mfg. Co., Ashland, O.

Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.

UNIONS, ORIFICE

Catawissa Valve & Fittings Co., Catawissa, Pa.
Conoflow Corp., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Ladish Co., Cudahy, Wis.
Taylor Forge & Pipe Wks., Chicago, Ill.
Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.

UNIONS, STEEL

Capitol Mfg. & Supply Co., Columbus, O.
Catawissa Valve & Fittings Co., Catawissa, Pa.
Champion Machine & Forging Co., Cleveland, O.
Chiksan Co., Brea, Calif.
Crane Co., Chicago, Ill.
Dart Union Co., Providence, R. I.
Das Div. of The Zeller Corp., Defiance, O.
Fairbanks Co., The, New York, N. Y.
Frick Co., Waynesboro, Pa.
Gilbert Brass Foundry Co., St. Louis, Mo.
Grinnell Co., Inc., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis. (Stainless steel and alloy only)
Henry Valve Co., Melrose Park, Ill.
Keystone Tool Corp., Houston, Tex.
Rockwood Sprinkler Co., Worcester, Mass.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.
Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.

UNIT COOLERS

See Coolers, Unit

UNIT HEATERS

See Heaters, Unit

UNIT VENTILATORS

See Ventilators, Unit

UNITS, AIR CONDITIONING, FOR AUTOMOBILES

Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Frigidaire Div., General Motors Corp., Dayton, O.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kool-Kar Co., Inc., Detroit, Mich.

UNITS, AIR CONDITIONING, BUS, TRUCK AND TRAILER

Carrier Corp., Syracuse, N. Y.
Kauffman Air Conditioning Corp., St. Louis, Mo.
McGraw Electric Co., Clark Div., Chicago, Ill.
Trane Co., The, La Crosse, Wis.
U. S. Thermo Control Co., Minneapolis, Minn.
Waukesha Motor Co., Waukesha, Wis.

UNITS, AIR CONDITIONING, CENTRAL STATION TYPE

Self contained blower, heating and/or cooling coil, filter, humidifier unit for remote location and duct air distribution

Air Conditionng Engineering Co., Cambridge, Mass.
Air & Refrigeration Corp., New York, N. Y.
Alton Mfg. Co., Dallas, Tex.
American Blower Corp., Detroit, Mich.
American Cooling Tower Co., Kansas City, Mo.
American Thermal Industries, Inc., Detroit, Mich.
Anetsberger Bros., Inc., Northbrook, Ill.
Bahnson Co., Winston-Salem, N. C.
Bakeraire Corp., South Windham, Me.
Bal-Air, Inc., Nashville, Tenn.
Bishop & Babcock Mfg. Co., Cleveland, O.
Blazer, M., & Son, Passaic, N. J.
Brunner Mfg. Co., Utica, N. Y.
Bryant Heater Div., Affiliated Gas Equipment Co. Inc., Cleveland, O.
Buensod-Stacey, Inc., New York, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Clarage Fan Co., Kalamazoo, Mich.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Deering Air Conditioning Co., Cincinnat, O.
Drayer-Hanson, Inc., Los Angeles, Calif.
Drying Systems, Inc., Chicago, Ill.
Frigidaire Div., General Motors Corp., Dayton, O.
Gannon Co., Russell R., Cincinnati, O.
Governair Corp., Oklahoma City, Okla.
Hastings Air Conditioning Co., Hastings, Neb.
Howe Ice Machine Co., Chicago, Ill.
Iron Fireman Mfg. Co., Cleveland, O.

Jaden Mfg. Co., Hastings, Neb.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Lennox Furnace Co., Marshalltown, Ia.
Lipman Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Meyer Furnace Co., The, Peoria, Ill.
Niagara Blower Co., New York, N. Y.
Palmer Mfg. Corp., Phoenix, Ariz.
Parks-Cramer Co., Fitchburg, Mass.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Rigidbilt Inc., Chicago, Ill.
Rinehart Inc., Richmond, Ind.
St. Louis Blow Pipe & Heater Co., Div. of Young Sales Corp., St. Louis, Mo.
Schnacke, Inc., Evansville, Ind.
Servel, Inc., Evansville, Ind. (absorption type)
Silco Products, Inc., Minneapolis, Minn.
Sterling Air Conditioning Corp., Charlotte, N. C.
Surface Combustion Corp., Toledo, O.
Trane Co., The, La Crosse, Wis.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
Union Asbestos & Rubber Co., Chicago, Ill.
United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.

UNITS, AIR CONDITIONING, EXCLUSIVELY FOR HOSPITAL OPERATING ROOMS, WITH EXPLOSIONPROOF MOTOR

Trane Co., The, La Crosse, Wis.

UNITS, AIR CONDITIONING, HORIZONTAL PACKAGE TYPE

Self contained blower, cooling and/or heating coil, filter, humidifier unit for ceiling or platform location in space conditioned, for connection to remote compressor or cold water supply, and steam or hot water

Air & Refrigeration Corp., New York, N. Y.
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Thermal Industries, Inc., Detroit, Mich.
Bakeraire Corp., South Windham, Me.
Bal-Air, Inc., Nashville, Tenn.
Blazer, M., & Son, Passaic, N. J.
Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O.
Buensod-Stacey, Inc., New York, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Bush Mfg. Co., West Hartford, Conn.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Clarage Fan Co., Kalamazoo, Mich.
Conditionaire Unit Co., Chicago, Ill.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Drayer-Hanson, Inc., Los Angeles, Calif.
Drying Systems, Inc., Chicago, Ill.
Frigidaire Div., General Motors Corp., Dayton, O.
Gannon Co., Russell R., Cincinnati, O.
General Electric Co., Air Conditioning Div., Bloomfield, N. J.
Governair Corp., Oklahoma City, Okla.
Hastings Air Conditioning Co., Hastings, Neb.
Jaden Mfg. Co., Hastings, Neb.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kennard Corp., St. Louis, Mo.
King Co., The, Owatonna, Minn.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Marlo Coil Co., St. Louis, Mo.
McIntyre Engineering Co., Inc., South San Francisco, Calif.
McQuay, Inc., Minneapolis, Minn.
Niagara Blower Co., New York, N. Y.
Parks-Cramer Co., Fitchburg, Mass.
Refrigeration Appliances Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rinehart Inc., Richmond, Ind.
St. Louis Blow Pipe & Heater Co., Div. of Young Sales Corp., St. Louis, Mo.
Super-Cold Corp., Los Angeles, Calif.
Tenney Engineering, Inc., Newark, N. J.
Trane Co., The, La Crosse, Wis.
Union Asbestos & Rubber Co., Chicago, Ill.
United Conditioning Corp., Croton Falls, N. Y.
United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.

UNITS, AIR CONDITIONING, INDUSTRIAL TYPE

Air & Refrigeration Corp., New York, N. Y.
American Blower Corp., Detroit, Mich.
American Cooling Tower Co., Kansas City, Mo.
American Thermal Industries, Inc., Detroit, Mich.
Anetsberger Bros., Inc., Northbrook, Ill.
Bakeraire Corp., South Windham, Me.
Bal-Air, Inc., Nashville, Tenn.
Bishop & Babcock Mfg. Co., Cleveland, O.
Blazer, M., & Son, Passaic, N. J.
Buffalo Forge Co., Buffalo, N. Y.
Bush Mfg. Co., West Hartford, Conn.
Carbide & Carbon Chemicals Co., A Div. of Union Carbide & Carbon Corp., New York, N. Y.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Clarage Fan Co., Kalamazoo, Mich.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Drayer-Hanson, Inc., Los Angeles, Calif.
Drying Systems, Inc., Chicago, Ill.
Economy Equipment Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Frigidaire Div., General Motors Corp., Dayton, O.
Gannon Co., Russell R., Cincinnati, O.
General Electric Co., Air Conditioning Div., Bloomfield, N. J.
Governair Corp., Oklahoma City, Okla.
Haertel Co., Walter, Minneapolis, Minn.
Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Jaden Mfg. Co., Hastings, Neb.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kennard Corp., St. Louis, Mo.
King Co., The, Owatonna, Minn.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Lintern Corp., Painesville, O.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
New York Blower Co., Chicago, Ill. (Make-up air units)
Niagara Blower Co., New York, N. Y.
Parks-Cramer Co., Fitchburg, Mass.
Pfening Co., Fred D., Columbus, O.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Remington Air Conditioning Div., Remington Corp., Auburn, N. Y.
Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rinehart Inc., Richmond, Ind.
St. Louis Blow Pipe & Heater Co., Div. of Young Sales Corp., St. Louis, Mo.
Silco Products, Inc., Minneapolis, Minn.
Somers, Inc., H. J., Detroit, Mich.
Super-Cold Corp., Los Angeles, Calif.
Surface Combustion Corp., Toledo, O.
Trane Co., The, La Crosse, Wis.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
Union Asbestos & Rubber Co., Chicago, Ill.
United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.

UNITS, AIR CONDITIONING, REVERSE REFRIGERATION CYCLE

Acme Industries, Inc., Jackson, Mich.
American Coils Co., Newark, N. J.
Brunner Mfg. Co., Utica, N. Y.
Fedders-Quigan Corp., Buffalo, N. Y.
General Electric Co., Air Conditioning Div., Bloomfield, N. J.
Muncie Gear Works, Inc., Muncie, Ind.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
York Corp., York, Pa.

UNITS, AIR CONDITIONING, SUMMER, EVAPORATIVE COOLING TYPE

For cooling by evaporation, no dehumidification

Air-Cooling Engineering Co., Evanston, Ill.
Air Equipment Co., Denver, Colo.
Air & Refrigeration Corp., New York, N. Y.
Alton Mfg. Co., Dallas, Tex.

American Blower Corp., Detroit, Mich.
American Cooling Tower Co., Kansas City, Mo.
American Moistening Co., Providence, R. I.
Aqua-Mist Co., Topeka, Kans.
Auburn Foundry, Inc., Stoker Div., Auburn, Ind.
Bahnson Co., Winston-Salem, N. C.
Barwick Mfg. Corp., Wichita, Kan.
Buensod-Stacey, Inc., New York, N. Y.
Campbell Co., E. K., Kansas City, Mo.
Carrier Corp., Syracuse, N. Y.
Central States Mfg. Co., Inc., Arkansas City, Kan.
Climax Machinery Co., Indianapolis, Ind.
Comfort Products Corp., Dallas, Tex.
Dearborn Stove Co., Dallas, Tex.
Drayer-Hanson, Inc., Los Angeles, Calif.
Essick Mfg. Co., Los Angeles, Calif.
Farr Co., Los Angeles, Calif.
Great National Air Conditioning Corp., Oklahoma City, Okla.
Hayes Furnace Mfg. & Supply Co., Los Angeles, Calif.
Heating Assurance, Inc., Spokane, Wash.
International Metal Products Co., Phoenix, Ariz.
Kool-Sleep, Inc., Cambridge, O.
Lennox Furnace Co., Marshalltown, Ia.
Little Giant Vaporizer Co., Inc., Oklahoma City, Okla. (vaporizers and pumps for evaporative coolers)
Martin Fan & Blower Co., Chicago, Ill.
Mefco Mfg. Co., Air Conditioning Div., Glendale, Calif.
Montag Stove & Furnace Works, Portland, Ore.
Morey, Dan, Los Angeles, Calif. (aspen fiber replacement mats)
Mountain States Equipment Co., Denver, Colo.
National Engineering & Mfg. Co., Sedalia, Mo.
National Gas Equipment Co., Inc., Terrell, Tex.
Palmer Mfg. Co., Phoenix, Ariz.
Polaire Cooler Co., Inc., El Mirage, Ariz.
Rheem Mfg. Co., New York, N. Y.
Rhode Island Humidifier & Ventilating Co., Boston, Mass.
Trade Wind Motorfans, Inc., Los Angeles, Calif.
United Electric Service Co., Wichita Falls, Tex.
Utility Appliance Corp., Los Angeles, Calif.
Western Blower Co., Seattle, Wash.
Wright Mfg. Co., Phoenix, Ariz.
X L Refrigerating Co., Chicago, Ill.

UNITS, AIR CONDITIONING, SUMMER, ROOM TYPE, FLOOR CABINET, REMOTE COMPRESSOR OR COLD WATER, UNDER 3 TONS CAPACITY

Self contained blower, coil, filter unit for connection to remote compressor or cold water supply

Air Conditioning Engineering Co., Cambridge, Mass.
Bal-Air, Inc., Nashville, Tenn.
Blazer, M. & Son, Passaic, N. J.
Bush Mfg. Co., West Hartford, Conn.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Drayer-Hanson, Inc., Los Angeles, Calif.
Frigidaire Div., General Motors Corp., Dayton, O.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
Hastings Air Conditioning Co., Hastings, Neb.
International Mfg. Co., Oklahoma City, Okla.
Jaden Mfg. Co., Hastings, Neb.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kennard Corp., St. Louis, Mo.
Lipman Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
McQuay, Inc., Minneapolis, Minn.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Nat Corp., Kansas City, Mo.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Rinehart Inc., Richmond, Ind.
Tenney Engineering, Inc., Newark, N. J.
Trane Co., The, La Crosse, Wis.
United States Air Conditioning Corp., Minneapolis, Minn.
United Conditioning Corp., Croton Falls, N. Y.
United States Radiator Corp., Detroit, Mich.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.

UNITS, AIR CONDITIONING, SUMMER, ROOM TYPE, FLOOR CABINET, SELF CONTAINED COMPRESSOR, UNDER 3 HP

Self contained blower, coil, compressor, filter unit

Ajax Corp. of America, Evansville, Ind.
Automatic Firing Corp., St. Louis, Mo.
Bakeraire Refrigeration Corp., South Windham, Me.
Bal-Air, Inc., Nashville, Tenn.
Brunner Mfg. Co., Utica, N. Y.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Crosley Div., Avco Mfg. Corp., Cincinnati, O.
Emerson Electric Mfg. Co., The, St. Louis, Mo.
Fedders-Quigan Corp., Buffalo, N. Y.
Hotpoint Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Jordon Refrigerator Co., Inc., Philadelphia, Pa.
Marlo Coil Co., St. Louis, Mo.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Muntz TV, Inc., Chicago, Ill.
Nat Corp., Kansas City, Mo.
Philco Corp., Philadelphia, Pa.
RCA Victor Div., Radio Corp. of America, Camden, N. J.
Rinehart Inc., Richmond, Ind.
Remington Air Conditioning Div., Remington Corp., Auburn, N. Y.
Schnacke, Inc., Evansville, Ind.
Servel, Inc., Evansville, Ind.
Surface Combustion Corp., Toledo, O.
Sutton Corp., O. A., The, Wichita, Kan.
Union Asbestos & Rubber Co., Chicago, Ill.
United Conditioning Corp., Croton Falls, N. Y.
United States Air Conditioning Corp., Minneapolis, Minn.
U. S. Machine Corp., Div. of Stewart-Warner Corp., Lebanon, Ind.
Viking Mfg. Corp., Cleveland, O.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
York Corp., York, Pa.

UNITS, AIR CONDITIONING, SUMMER, STORE TYPE, FLOOR CABINET, SELF CONTAINED COMPRESSOR, 3 HP AND OVER

Self contained blower, coil, compressor, filter unit with air discharge approximately 6 ft above floor

American Thermal Industries, Inc., Detroit, Mich.
Automatic Firing Corp., St. Louis, Mo.
Bakeraire Corp., South Windham, Me.
Bal-Air, Inc., Nashville, Tenn.
Barkow Mfg. Co., Inc., Aug. G., Milwaukee, Wis.
Brunner Mfg. Co., Utica, N. Y.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Frick Co., Waynesboro, Pa.
Frigid, Inc., Brooklyn, N. Y.
Frigidaire Div., General Motors Corp., Dayton, O.
General Electric Co., Air Conditioning Div., Bloomfield, N. J.
Governair Corp., Oklahoma City, Okla.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Nat Corp., Kansas City, Mo.
Rinehart Inc., Richmond, Ind.
Servel, Inc., Evansville, Ind. (absorption type)
Sterling Air Conditioning Corp., Charlotte, N. C.
Surface Combustion Corp., Toledo, O.
Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
Union Asbestos & Rubber Co., Chicago, Ill.
United Conditioning Corp., Croton Falls, N. Y.
U. S. Machine Corp., Div. of Stewart-Warner Corp., Lebanon, Ind.
United States Air Conditioning Corp., Minneapolis, Minn.
Viking Mfg. Corp., Cleveland, O.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Williams Div., Eureka Williams Corp., Bloomington, Ill.
Worthington Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
York-Shipley, Inc., York, Pa.

UNITS, AIR CONDITIONING, WINDOW TYPE

Air Conditioning Engineering Co., Cambridge, Mass.
Amana Refrigeration, Inc., Amana, Ia.
Artkraft Mfg. Co., Lima, O.
Automatic Firing Corp., St. Louis, Mo.
Bakeraire Corp., South Windham, Me.
Bard Mfg. Co., Bryan, O.
Blissfield Mfg. Co., Blissfield, Mich.
Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O.
Cauhorn Distributing Co., Detroit, Mich.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Coolerator Co., Duluth, Minn.
Crowell & Dunn, Inc., New York, N. Y.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Dayton Pump & Mfg. Co., Dayton, O.
Deering Air Conditioning Co., Cincinnati, O. (for casement windows)
Emerson Electric Mfg. Co., The, St. Louis, Mo.
Emerson Radio and Phonograph Co., New York, N. Y.
Fedders-Quigan Corp., Buffalo, N. Y.
Fresh'nd-Aire Company, Div. of Cory Corp., Chicago, Ill.
Friedrich Refrigerators, Inc., San Antonio, Tex.
Frigid, Inc., Brooklyn, N. Y.
Frigidaire Div., General Motors Corp., Dayton, O.
General Electric Co., Major Appliance Div., Louisville, Ky.
Gibson Refrigerator Co., Greenville, Mich.
Hotpoint Co., Chicago, Ill.

Hunter Fan and Ventilating Co., Inc., Memphis, Tenn.
Jordon Refrigerator Co., Inc., Philadelphia, Pa.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kelvinator Div., Nash-Kelvinator Corp., Detroit, Mich.
Larkin Coils, Inc., Atlanta, Ga.
Lipman Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Magic Chef, Inc., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Mitchell Mfg. Co., Chicago, Ill.
Motor Products Corp., Deepfreeze Appliance Div., North Chicago, Ill.
Mueller Furnace Co., L. J., Milwaukee, Wis.
National Engineering & Mfg. Co., Sedalia, Mo.
Norge Heat Div., Borg-Warner Corp., Kalamazoo, Mich.
Payne Furnace Div., Affiliated Gas Equipment Inc., Monrovia, Calif.
Perfection Stove Co., Cleveland, O.
Philco Corp., Philadelphia, Pa.
Pleasantaire Corp., Washington, D. C.
Quiet-Heet Mfg. Corp., Newark, N. J.
Radio Corp. of America, RCA Victor Div., Camden, N. J.
Remington Air Conditioning Div., Remington Corp., Auburn, N. Y.
Robbins & Myers, Inc., Fan Div., Memphis, Tenn.
Rheem Mfg. Co., New York, N. Y.
Servel, Inc.,, Evansville, Ind.
Sterling Air Conditioning Corp., Charlotte, N. C.
Sub-Zero Products Co., Cincinnati, O.
Sutton Corp., O. A., The, Wichita, Kan.
Tele King Corp., New York, N. Y.
Tywel Mfg. Corp., Brooklyn, N. Y.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
United Conditionng Corp., Croton Falls, N. Y.
United States Air Conditioning Corp., Minneapolis, Minn.
Victor Products Corp., Hagerstown, Md.
Viking Air Conditioning Div., The National Radiator Co., Cleveland, O.
Viking Mfg. Corp., Cleveland, O.
Westinghouse Electric Corp., Electric Appliance Div., East Springfield, Mass.
Worthington Corp., Air Conditioning Refrigeration Div., Harrison, N. J.
York Corp., York, Pa.

UNITS, AIR CONDITIONING, WINTER, ROOM TYPE, FLOOR CABINET

Self contained blower, filter, heating coil, humidifier unit

Air Conditioning Engineering Co., Cambridge, Mass.
Air & Refrigeration Corp., New York, N. Y.
Aladdin Heating Corp., Oakland, Calif.
Auburn Burner Co., Auburn, Ind.
Bakeraire Corp., South Windham, Me.
Bryant Industrial Div., Affiliated Gas Equipment Co., Inc., Cleveland, O.
Buffalo Forge Co., Buffalo, N. Y.
Campbell Heating Co., Des Moines, Ia.
Circulators & Devices Mfg. Corp., Brooklyn, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
Dalzen Mfg. Co., St. Clair, Mich.
Drayer-Hanson, Inc., Los Angeles, Calif.
Johnson Co., S. T., Bridgeport, Pa.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kehm Corp., The, Chicago, Ill.
Kennard Corp., St. Louis, Mo.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Refrigeration Economics Co., Inc., Canton, O.
Reznor Mfg. Co., Mercer, Pa.
Somers, Inc., H. J., Detroit, Mich.
Surface Combustion Corp., Toledo, O.
Trane Co., The, La Crosse, Wis.
United States Air Conditioning Corp., Minneapolis, Minn.
United Conditioning Corp., Croton Falls, N. Y.
United States Radiator Corp., Detroit, Mich.
Viking Mfg. Corp., Cleveland, O.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
York Corp., York, Pa.

UNITS, AIR CONDITIONING, YEAR AROUND, ROOM TYPE, FLOOR CABINET

Self contained blower, or primary air supply, cooling and heating coil, filter, humidifier unit for connection to remote compressor or cold water supply, and steam or hot water supply

Acme Industries, Inc., Jackson, Mich.
Air Conditioning Engineering Co., Cambridge, Mass.
Air & Refrigeration Corp., New York, N. Y.
American Coils Co., Newark, N. J.
American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Auburn Burner Co., Auburn, Ind.
Bakeraire Corp., South Windham, Me.
Bal-Air, Inc., Nashville, Tenn.
Barkow Mfg. Co., Inc., Aug. G., Milwaukee, Wis.
Brown Products Co., Forest Hills, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Bush Mfg. Co., West Hartford, Conn.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton. O.
Clarage Fan Co., Kalamazoo, Mich.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Drayer-Hanson, Inc., Los Angeles, Calif.
Dunham Co., Chicago, Ill.
Frigidaire Div., General Motors Corp., Dayton, O.
Gannon Co., Russell R., Cincinnati, O.
Hastings Air Conditioning Co., Hastings, Neb.
International Mfg. Co., Oklahoma City, Okla.
Jaden Mfg. Co., Hastings, Neb.
Johnson Co., S. T., Bridgeport, Pa.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Lipman Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Nat Corp., Kansas City, Mo.
Niagara Blower Co., New York, N. Y.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Remington Air Conditioning Div., Remington Corp., Auburn, N. Y.
Rittling Corp., The, Buffalo, N. Y.
Servel, Inc., Evansville, Ind.
Trane Co., The, La Crosse, Wis.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
United Conditioning Corp., Croton Falls, N. Y.
United States Air Conditioning Corp., Minneapolis, Minn.
United States Radiator Corp., Detroit, Mich.
Viking Mfg. Corp., Cleveland, O.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison N. J.
York Corp., York, Pa.

UNITS, CONDENSATE DISPOSAL

See Pumps, Condensate, For Removing Condensation from Air Conditioning Units

UNITS, FUEL OIL, HEATING, PUMPING AND STRAINING

Ace Engineering Co., Chicago, Ill.
Alstrom Corp., Bronx, N. Y.
Byron Jackson Co., Los Angeles, Calif.
Coen Co., San Francisco, Calif.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davis Engineering Corp., Elizabeth, N. J.
Drying Systems, Inc., Chicago, Ill.
Duo-Therm Div., Motor Wheel Corp., Lansing, Mich.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Engineer Co., New York, N. Y.
Faber Engineer Co., Philadelphia, Pa.
Foster Pump Wks., Inc., Brooklyn, N. Y.
Graham Mfg. Co., Inc., New York, N. Y.
Hauck Mfg. Co., Brooklyn, N. Y.
Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y.
Leahy Mfg. Co., Los Angeles, Calif.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Peabody Engineering Corp., New York, N. Y.
Petro, Cleveland, O.
Ray Oil Burner Co., San Francisco, Calif.
Staples & Pfeiffer, San Francisco, Calif.
Todd Shipyards Corp., Combustion Equipment Div., Elmhurst, L. I., N. Y.
Tuthill Pump Co., Chicago, Ill.
Webster Electric Co., Racine, Wis.
Wilson Engineering Corp., Chicago, Ill.

UNITS, HEAT RECOVERY, AIR-TO-AIR

Therm-o-Wheel, Inc., Far Rockaway, N. Y.

UNITS, STERILIZING, AIR

Cooper Hewitt Electric Co., Hoboken, N. J.
Germatrol Corp., Pittsburgh, Pa.
Hanovia Chemical & Mfg. Co., Newark, N. J.
Health Trola Div., Excel Heating & Air Conditioning Co., Chicago, Ill.
Hydrocol-Air-Sanitation, Inc., New York, N. Y.
Iron City Chemical Co., Valencia, Pa.
Lientz Co., B. P., Kansas City, Mo.
National Air Conditioning, Inc., Johnstown, Pa.
Pittsburgh Chemical Laboratories, Inc., Pittsburgh, Pa.

UNITS, WINDOW VENTILATOR AND FILTER

Airgard Mfg. Co., Chicago, Ill.
Berns Mfg. Co., Chicago, Ill.
Circulators & Devices Mfg. Corp., Brooklyn, N. Y.
Diehl Mfg. Co., Finderne Plant, Somerville, N. J.
Goettl Bros. Metal Prod., Inc., Phoenix, Ariz.
Health Trola Div., Excel Heating & Air Conditioning Co., Chicago.
Ilg Electric Ventilating Co., Chicago, Ill.
Kaiser Co., H. S., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Meier Electric & Machine Co., Inc., Indianapolis, Ind.

Mellish & Murray Co., Chicago, Ill.
Palmer Mfg. Corp., Phoenix, Ariz.
Reed Unit-Fans, Inc., New Orleans, La.
Reliable Metal Engineering Co., Chicago, Ill.
Rittling Corp., The, Buffalo, N. Y.
Schwitzer-Cummins Co., Indianapolis, Ind.
Somers Inc., H. J., Detroit, Mich.
Standard Electric Mfg. Co., West Berlin, N. J.
Utility Appliance Corp., Los Angeles, Calif.

UNIVERSAL JOINTS

See Joints, Universal, for Operating Valves

VACUUM CLEANERS FOR BOILERS

See Cleaners, Vacuum, for Boilers

VACUUM CLEANING SYSTEMS, FITTINGS FOR

See Fittings for Central Vacuum Cleaning Systems

VACUUM GAGES

See Gages, Indicating, Vacuum

VACUUM HEATING SYSTEMS

See Systems, Heating, Vacuum

VACUUM PUMPS

See Pumps, Vacuum

VACUUM RECORDERS

See Recorders, Pressure and Vacuum

VALVE OPERATORS

See Operators, Valve

VALVE RESEATERS

See Reseaters, Valve

VALVES, AIR OPERATING

Airmatic Valve, Inc., Cleveland, O.
American Moistening Co., Providence, R. I.
Atlas Valve Co., Newark, N. J.
Automatic Switch Co., Orange, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Barksdale Valves, Los Angeles, Calif.
Bellows Co., The, Akron, O.
Bristol Co., The, Waterbury, Conn.
Clark Controller Co., Cleveland, O.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Davis Regulator Co., Chicago, Ill.
De Zurik Shower Co., Sartell, Minn.
Eclipse Fuel Engineering Co., Rockford, Ill.
Electric Sprayit Co., The, Sheboygan, Wis.
Fischer & Porter Co., Hatboro, Pa.
Fisher Governor Co., Marshalltown, Ia.
Foxboro Co., Foxboro, Mass.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis.
Hills-McCanna Co., Chicago, Ill.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Hunt & Son, Inc., C. B., Salem, O.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Jordan Regulator Co., Lebanon, O.
Keckley Co., O. Co., Chicago, Ill.
Keller Tool Co., Grand Haven, Mich.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kieley & Mueller, Inc., Middletown, N. Y.
Klipfel Valves, Inc., Hamilton, O.
Ledeen Mfg. Co., Los Angeles, Calif.
Leslie Co., Lyndhurst, N. J.
McAlear Mfg. Co., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Norwalk Valve Co., South Norwalk, Conn.
Paul Valve Corp., New York, N. Y.
Powell Co., Wm., The, Cincinnati, O.
Powers Regulator Co., Skokie, Ill.
Schade Valve Mfg. Co., Philadelphia, Pa.
Skinner Electric Valve Div., New Britain, Conn.
Smith Co., S. Morgan, York, Pa.
Swartwout Co., The, Cleveland, O.
Trerice Co., H. O., Detroit, Mich.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Vernon Tool Co., Ltd., Alhambra, Calif.
Wedgeplug Valve Co., Inc., New Orleans, La.
Weston Electrical Instrument Corp., Newark, N. J.
Wilson Engineering Corp., Chicago, Ill.

VALVES, ANGLE

Alloy Steel Products Co., Linden, N. J. (Stainless steel)
American Car & Foundry Co., New York, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Beckett & Co., Inc., Thomas, Dallas, Tex.
Belknap Mfg. Co., Bridgeport, Conn.
Bordo Co., Inc., L. J., Glenside, Pa. (Plug)
Carpenter Mfg. Corp., The, Cleveland, O.
Central Brass Mfg. Co., Cleveland, O.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Cleveland Brass Mfg. Co., The, Cleveland, O.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Crane Co., Chicago, Ill.
Detroit Brass & Malleable Wks., Detroit, Mich.
De Zurik Shower Co., Sartell, Minn.
Duriron Co., The, Dayton, O. (acid resisting)
Edward Valves, Inc., East Chicago, Ind.
Fairbanks Co., The, New York, N. Y.
Farris Engineering Corp., Palisades Park, N. J.
General Ceramics & Steatite Corp., Keasbey, N. J.
Grinnell Co., Inc., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Hammond Brass Works, Hammond, Ind.
Hasco Valve & Machine Co., Milwaukee, Wis. (alloy)
Henry Valve Co., Melrose Park, Ill.
Hills-McCanna Co., Chicago, Ill.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Jacuzzi Bros., Inc., Richmond, Calif.
Jarecki Valve Div. of H. K. Porter Co., Inc., Tulsa, Okla.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Leslie Co., Lyndhurst, N. J.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Luzerne Rubber Co., Trenton, N. J. (Hard Rubber)
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marine & Industrial Products Co., Philadelphia, Pa.
Marsh Heating Equipment Co., Skokie, Ill.
Marsh Valve Co., Dunkirk, N. Y.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Morse-Smith-Morse, Inc., Watertown, Mass.
Mueller Brass Co., Port Huron, Mich.
Nason Co., Clarkston, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
OPW Corp., Cincinnati, O.
Ohio Brass Co., Mansfield, O.
Ohio Injector Co., Wadsworth, O.
Okadee Co., Chicago, Ill.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Rockwell Mfg. Co., Meter and Valve Div., Pittsburgh, Pa.
Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Stockham Valves & Fittings, Birmingham, Ala.
Strahman Valves, Inc., New York, N. Y.
Superior Valve & Fittings Co., Pittsburgh, Pa.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Vacuum-Electronic Engineering Co., New Hyde Park, L. I., N. Y.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vanton Pump & Equipment Corp., New York, N. Y.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.
White Flomatic Corp., Hoosick Falls, N. Y.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, AUTOMATIC SHUTOFF WITH MANUAL RESET

Automatic Switch Co., Orange, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Cla-Val Co., Alhambra, Calif.
Cooper Co., Clark, Palmyra, N. J.
Davis Regulator Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fisher Governor Co., Marshalltown, Ia.
General Controls Co., Glendale, Calif.
Norwalk Valve, South Norwalk, Conn.
Roylyn, Inc., Glendale, Calif.
Skinner Electric Valve Div., New Britain, Conn.
Sullivan Valve & Engineering Co., Butte, Mont.
Vernon Tool Co., Ltd., Alhambra, Calif.

VALVES, BACK PRESSURE

Associated Valve & Engineering Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.

Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Cash Valve Mfg. Corp., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Cla-Val Co., Alhambra, Calif.
Cooper Co., Clark, Palmyra, N. J.
Davis Regulator Co., Chicago, Ill.
Fischer Governor Co., Marshalltown, Ia.
Hammel-Dahl Co., Providence, R. I.
Jordan Regulator Corp., Lebanon, O.
Keckley Co., O. C., Chicago, Ill.
Klipfel Valves, Inc., Hamilton, O.
Mason-Neilan Regulator Co., Boston, Mass.
Norwalk Valve Co., South Norwalk, Conn.
Spence Engineering Co., Inc., Walden, N. Y.

VALVES, BALANCING, FOR FORCED HOT WATER HEATING SYSTEMS

Bell & Gossett Co., Morton Grove, Ill.
Detroit Controls Corp., Detroit, Mich.
Farris Engineering Corp., Palisades Park, N. J.
G & H Mfg. Co., Philadelphia, Pa.
General Heaters & Regulators Co., East Chicago, Ind.
Hammond Brass Works, Hammond, Ind.
Hi-Flow Products, Inc., Lindenhurst, N. Y.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
J O Mfg. Co., South Gate, Calif.
Maid-O'-Mist, Inc., Chicago, Ill.
Marsh Heating Equipment Co., Skokie, Ill.
Marsh Valve Co., Dunkirk, N. Y.
Ohio Brass Co., Mansfield, O.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
T & H Engineering Co., Little Ferry, N. J.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, La Crosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Welsbach Corp., The, Kitson Div., Philadelphia, Pa.

VALVES, BAR STOCK

Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Greer Hydraulics, Inc., Brooklyn, N. Y.
Grove Regulator Co., Oakland, Calif.
Guardian Products Corp., Michigan City, Ind.
Hammel-Dahl Co., Providence, R. I.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lunkenheimer Co., Cincinnati, O.
Paul Valve Corp., New York, N. Y.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., The, Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Rockford Sprinkler Co., Worcester, Mass.
Star Stainless Screw Co., Paterson, N. J.
Vacuum-Electronic Engineering Co., New Hyde Park, L. I., N. Y.
Walworth Co., New York, N. Y.
Weatherhead Co., The, Cleveland, O.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, BLOW-OFF

Barrett Machine Co., Pittsburgh, Pa.
Bordo Co., Inc., L. J., Glenside, Pa.
Carpenter Mfg. Corp., The, Cleveland, O.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Crane Co., Chicago, Ill.
Edward Valves, Inc., East Chicago, Ind.
Everlasting Valve Co., Jersey City, N. J.
Fairbanks Co., The, New York, N. Y.
Farris Engineering Corp., Palisades Park, N. J.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Jenkins Bros., New York, N. Y.
Kaye & MacDonald, Inc., West Orange, N. J.
Keckley Co., O. C., Chicago, Ill.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Madden Corp., The, Chicago, Ill.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marine & Industrial Products Co., Philadelphia, Pa.
McDonnell & Miller, Inc., Chicago, Ill.
Norgren Co., C. A., Englewood, Colo.
Ohio Injector Co., Wadsworth, O.
Okadee Co., Chicago, Ill.
Paul Valve Corp., New York, N. Y.
Powell Co., Wm., The, Cincinnati, O.
Schade Valve Mfg. Co., Philadelphia, Pa.
Strong, Carlisle & Hammond Co., Cleveland, O.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.
Wilson Engineering Corp., Chicago, Ill.
Yarnall-Waring Co., Philadelphia, Pa.

VALVES, BOILER, NON-RETURN

Edward Valves, Inc., East Chicago, Ind.
Farris Engineering Corp., Palisades Park, N. J.
Golden Anderson Valve Specialty Co., Pittsburgh, Pa.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Lunkenheimer Co., Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.

VALVES, BUTTERFLY

Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Conoflow Corp., Philadelphia, Pa.
Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fabri-Valve Co. of America, Portland, Ore.
Fisher Governor Co., Marshalltown, Ia.
General Ceramics & Steatite Corp., Keasbey, N. J.
General Controls Co., Glendale, Calif., and Skokie, Ill.
Hammel-Dahl Co., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis. (alloy)
Hauck Mfg. Co., Brooklyn, N. Y.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Keystone Tool Corp., Houston, Tex.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
North American Mfg. Co., Cleveland, O.
Norwalk Valve Co., South Norwalk, Conn.
Powell Co., Wm., The, Cincinnati, O.
Rockwell Co., W. S., Fairfield, Conn.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Smith Co., S. Morgan, York, Pa.
Tri-Clover Machine Co., Kenosha, Wis.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, BYPASS, WITH PROVISIONS FOR SOME CIRCULATION WHEN CLOSED

Lunkenheimer Co., Cincinnati, O.
Ohio Brass Co., Mansfield, O.
Skinner Electric Valve Div., New Britain, Conn.
Stockham Valves & Fittings Co., Birmingham, Ala.

VALVES, CHECK

Alloy Steel Products Co., Linden, N. J. (Stainless steel)
American Car & Foundry Co., New York, N. Y.
American Hard Rubber Co., New York, N. Y. (Rubber lined)
Aminco Refrigeration Products Co., Detroit, Mich.
Amp Corp., St. Louis, Mo.
A-P Controls Corp., Milwaukee, Wis.
Barrett, Haentjens & Co., Hazelton, Pa.
Belknap Mfg. Co., Bridgeport, Conn.
Catawissa Valve & Fittings Co., Catawissa, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Cla-Val Co., Alhambra, Calif.
Cochrane Corp., Philadelphia, Pa.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Detroit Brass & Malleable Wks., Detroit, Mich.
Durabla Mfg. Co., New York, N. Y.
Duriron Co., Inc., The, Dayton, O. (acid resisting)
Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
Edward Valves, Inc., East Chicago, Ind.
Fabri-Valve Co. of America, Portland, Ore.
Fairbanks Co., The, New York, N. Y.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Frick Co., Waynesboro, Pa.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
General Ceramics & Steatite Corp., Keasbey, N. J. (chemical stoneware & porcelain)
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Greer Hydraulics, Inc., Brooklyn, N. Y.
Grinnell Co., Inc., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
Hammond Brass Works, Hammond, Ind.
Hasco Valve & Machine Co., Milwaukee, Wis. (alloy)
Henry Valve Co., Melrose Park, Ill.
Hersey Mfg. Co., South Boston, Mass.
Hold-Tite Valve Mfg. Co., New York, N. Y.
Imperial Brass Mfg. Co., Chicago, Ill.
Jacuzzi Bros., Inc., Richmond, Calif.
James-Pond-Clark, Pasadena, Calif.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.

Kerotest Mfg. Co., Pittsburgh, Pa.
Keystone Tool Corp., Houston, Tex.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead lined)
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Mansfield & Green, Cleveland, O.
McRae Corp., Los Angeles, Calif.
Milwaukee Valve Co., Milwaukee, Wis.
Morse-Smith-Morse Inc., Watertown, Mass.
Mueller Brass Co., Port Huron, Mich.
Norgren Co., C. A., Englewood, Colo.
Northern Indiana Brass Co., Elkhart, Ind.
Norwalk Valve Co., South Norwalk, Conn.
OPW Corp., Cincinnati, O.
Ohio Brass Co., Mansfield, O.
Ohio Injector Co., Wadsworth, O.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Phillips & Co., H. A., Chicago, Ill.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Pokorney Mfg. Co., Chicago, Ill.
Powell Co., Wm., The, Cincinnati, O.
Preferred Utilities Mfg. Corp., New York, N. Y.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Rensselaer Valve Co., Cohoes, N. Y.
Roylyn, Inc., Glendale, Calif.
Ruggles-Klingemann Mfg. Co., Boston, Mass. (Bleeder type)
Saran Lined Pipe Co., Ferndale, Mich. (Saran Lined)
Schaible Co., The, Cincinnati, O.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Smolensky Valve Co., Inc., Bedford, O.
Star Stainless Screw Co., Paterson, N. J.
Stockham Valves & Fittings, Birmingham, Ala.
Stokes Molded Products, Inc., Trenton, N. J. (Hard rubber)
Strong, Carlisle & Hammond Co., Cleveland, O.
Superior Valve and Fittings Co., Pittsburgh, Pa.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Vanton Pump & Equipment Corp., New York, N. Y.
Vernon Tool Co., Ltd., Alhambra, Calif.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.
White Flomatic Corp., Hoosick Falls, N. Y.
Whittaker Co., Wm. R., Los Angeles, Calif.
Williams Gauge Co., The, Pittsburgh, Pa. (Noiseless)
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, COMPRESSOR

Bakeraire Corp., South Windham, Me.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Detroit Stamping Co., Detroit, Mich.
Durabla Mfg. Co., New York, N. Y.
Electric Sprayit Co., The, Sheboygan, Wis.
Frick Co., Waynesboro, Pa.
Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Mueller Brass Co., Port Huron, Mich.
OPW Corp., Cincinnati, O.
Ohio Injector Co., Wadsworth, O.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Schaible Co., The, Cincinnati, O.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Vilter Mfg. Co., The, Milwaukee, Wis.
Voss Co., J. H. H., Inc., New York, N. Y.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, DIAPHRAGM

American Hard Rubber Co., New York, N. Y. (Rubber lined)
Associated Valve & Engineering Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Automatic Switch Co., Orange, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Bristol Co., The, Waterbury, Conn.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Cla-Val Co., Alhambra, Calif.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Duriron Co., Inc., The, Dayton, O. (acid resisting)
Eclipse Fuel Engineering Co., Rockford, Ill.
Farris Engineering Corp., Palisades Park, N. J.
Fischer & Porter Co., Hatboro, Pa.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Foxboro Co., Foxboro, Mass.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
General Ceramics & Steatite Corp., Keasbey, N. J. (Chemical stoneware & porcelain)
General Controls Co., Glendale, Calif., and Skokie, Ill.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grinnell Co., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
Hagan Corp., Pittsburgh, Pa.
Hammel-Dahl Co., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis. (alloy)
Hills-McCanna Co., Chicago, Ill.
Hubbell Corp., Mundelein, Ill.
Hunt & Son, Inc., C. B., Salem, O.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Kainer & Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Kieley & Mueller, Inc., Middletown, N. Y.
Klipfel Valves, Inc., Hamilton, O.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead lined)
Leslie Co., Lyndhurst, N. J.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
McRae Corp., Los Angeles, Calif.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia.
Mueller Brass Co., Port Huron, Mich.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
National Radiator Co., The, Johnstown, Pa.
Norgren Co., C. A., Englewood, Colo.
North American Mfg. Co., Cleveland, O.
Norwalk Valve Co., South Norwalk, Conn.
Parks-Cramer Co., Fitchburg, Mass.
Paul Valve Corp., New York, N. Y.
Penn Controls, Inc., Goshen, Ind.
Penn Industrial Equipment Corp., Philadelphia, Pa.
Perfex Corp., Milwaukee, Wis.
Powers Regulator Co., Skokie, Ill.
Ross Valve Mfg. Co., Inc., Troy, N. J.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Saran Lined Pipe Co., Ferndale, Mich. (Saran lined)
Schade Valve Mfg. Co., Philadelphia, Pa.
Smith Co., S. Morgan, York, Pa.
Staples & Pfeiffer, San Francisco, Calif.
Swartwout Co., The, Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.
Trane Co., The, La Crosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Inc., Peru, Ind.
United States Rubber Co., New York, N. Y.
Warren Engineering Co., Broadway, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Weston Electrical Instrument Corp., Newark, N. J.
White-Rodgers Electric Co., St. Louis, Mo.

VALVES, DIAPHRAGM, PACKLESS

Associated Valve & Engineering Co., Chicago, Ill.
Automatic Switch Co., Orange, N. J.
Cla-Val Co., Alhambra, Calif.
Cook Electric Co., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
Foxboro Co., Foxboro, Ill.
Hammel-Dahl Co., Providence, R. I.
Henry Valve Co., Melrose Park, Ill.
Hills-McCanna Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Skinner Electric Valve Div., New Britain, Conn.
Superior Valve and Fittings Co., Pittsburgh, Pa.

VALVES, FIRE PROTECTION, SPRINKLER SYSTEM CONTROL

Allen Mfg. Co., W. D., Chicago, Ill.
Barber-Colman Co., Rockford, Ill.
Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Everlasting Valve Co., Jersey City, N. J.
Fairbanks Co., The, New York, N. Y.
Grinnell Co., Inc., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
Hersey Mfg. Co., South Boston, Mass.
Hodgman Mfg. Co., Taunton, Mass.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
McRae Corp., Los Angeles, Calif.
Ohio Injector Co., Wadsworth, O.
Okadee Co., Chicago, Ill.

Raisler Corp., Grimes Sprinkler Div., New York, N. Y.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Rockwood Sprinkler Co., Worcester, Mass.
Stockham Valves & Fittings, Birmingham, Ala.
Superior Controls Co., Inc., Los Angeles, Calif.
Valco, Inc., Cincinnati, O.
Vernon Tool Co., Ltd., Alhambra, Calif.
Walworth Co., New York, N. Y.

VALVES, FLOAT

A-P Controls Corp., Milwaukee, Wis. (Oil)
Aerotec Corp., The, Greenwich, Conn.
Alco Valve Co., St. Louis, Mo.
American Hard Rubber Co., New York, N. Y. (Hard rubber)
American Moistening Co., Providence, R. I.
Associated Valve & Engineering Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Beckett & Co., Inc., Thomas, Dallas, Tex.
Boylston Steam Specialty Co., Chicago, Ill.
Caldwell Co., W. E., Louisville, Ky.
Cash Co., A. W., Decatur, Ill.
Central Brass Mfg. Co., Cleveland, O.
Cla-Val Co., Alhambra, Calif.
Cleveland Humidifier Co., Cleveland, O.
Cochrane Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Darling Valve & Mfg. Co., Williamsport, Pa.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Detroit Controls Corp., Detroit, Mich.
Duriron Co., Inc., The, Dayton, O. (acid resisting)
Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Frick Co., Waynesboro, Pa.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
Hasco Valve & Machine Co., Milwaukee, Wis.
Hubbell Corp., Mundelein, Ill.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., Middletown, N. Y.
Klipfel Valves, Inc., Hamilton, O.
Locke Regulator Co., Salem, Mass.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Maid-O'-Mist, Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Industrial Div., Phialdelphia, Pa.
Monash-Younker Co., Chicago, Ill.
Morey, Dan, Los Angeles, Calif.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Perfex Corp., Milwaukee, Wis.
Phillips & Co., H. A., Chicago, Ill.
Robert Mfg. Co., Los Angeles, Calif.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Shade Valve Mfg. Co., Philadelphia, Pa.
Schaub Engineering Co., Fred H., Chicago, Ill.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Scoville Mfg. Co., Waterville Div., Waterville, Conn.
Smith Co., S. Morgan, York, Pa.
Spence Engineering Co., Inc., Walden, N. Y.
Stickle Steam Specialties Co., Indianapolis, Ind.
Watts Regulator Co., Lawrence, Mass.

VALVES, FLOW CONTROL, FOR HOT WATER HEATING SYSTEMS

Barber-Colman Co., Rockford, Ill.
Bell & Gossett Co., Morton Grove, Ill.
Dunham Co., C. A., Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
General Controls Co., Glendale, Calif., and Skokie, Ill.
General Heaters & Regulators Co., East Chicago, Ind.
Hammel-Dahl Co., Providence, R. I.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Kainer & Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Quality Specialty Co., Camden, N. J.
Sall Bros. Co., Rockford, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
Taco Heaters, Inc., Providence, R. I.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, La Crosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Webster & Co., Warren, Camden, N. J.
White Flomatic Corp., Hoosick Falls, N. Y.

VALVES, FORGED STEEL

American Meter Co., Inc., Philadelphia, Pa.
Catawissa Valve & Fittings Co., Catawissa, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Conoflow Corp., Philadelphia, Pa.
Crane Co., Chicago, Ill.
Edward Valves, Inc., East Chicago, Ind.
Farris Engineering Corp., Palisades Park, N. J.
Grove Regulator Co., Oakland, Calif.
Henry Valve Co., Melrose Park, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marine & Industrial Products Co., Philadelphia, Pa.
Ohio Injector Co., Wadsworth, O.
Paul Valve Corp., New York, N. Y.
Penberthy Injector Co., Detroit, Mich.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Smith Co., S. Morgan, York, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

VALVES, GATE, ALLOY

Alloy Steel Products Co., Linden, N. J.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Edward Valves, Inc., East Chicago, Ind.
Electric Steel Foundry Co., Portland, Ore.
Fabri-Valve Co. of America, Portland, Ore.
Fischer & Porter Co., Hatboro, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Milwaukee Valve Co., Milwaukee, Wis.
Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Rockwell Co., W. S., Fairfield, Conn.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Walworth Co., New York, N. Y.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, GATE, BRASS AND BRONZE

Belknap Mfg. Co., Bridgeport, Conn.
Bordo Co., Inc., L. J., Glenside, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
Darling Valve Mfg. Co., Williamsport, Pa.
Detroit Brass & Malleable Wks., Detroit, Mich.
Detroit Controls Corp., Detroit, Mich.
Eddy Valve Co., Waterford, N. Y.
Everlasting Valve Co., Jersey City, N. J.
Fairbanks Co., The, New York, N. Y.
Hammond Brass Wks., Hammond, Ind.
Jarecki Valve Div., H. K. Porter & Co., Inc., Tulsa, Okla.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Tin lined)
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Milwaukee Valve Co., Milwaukee, Wis.
Morrison Brothers Co., Dubuque, Ia.
Northern Indiana Brass Co., Elkhart, Ind.
OPW Corp., Cincinnati, O.
Ohio Brass Co., Mansfield, O.
Ohio Injector Co., Wadsworth, O.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Rensselaer Valve Co., Cohoes, N. Y.
Rockwell Co., W. S., Fairfield, Conn.
Schaible Co., The, Cincinnati, O.
Scott Valve Mfg. Co., Detroit, Mich.
Stockham Valves & Fittings, Birmingham, Ala.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Walworth Co., New York, N. Y.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, GATE, IRON BODY

Bordo Co., Inc., L. J., Glenside, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
De Zurik Shower Co., Sartell, Minn.

Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
Everlasting Valve Co., Jersey City, N. J.
Fairbanks Co., The, New York, N. Y.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead and tin lined)
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Mueller Co., Decatur, Ill.
Ohio Injector Co., Wadsworth, O.
Okadee Co., Chicago, Ill.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Rensselaer Valve Co., Cohoes, N. Y.
Rockwell Co., W. S., Fairfield, Conn.
Scott Valve Mfg. Co., Detroit, Mich.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Stockham Valves & Fittings, Birmingham, Ala.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Walworth Co., New York, N. Y.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, GATE, MALLEABLE IRON

Bordo Co., Inc., L. J., Glenside, Pa
Crane Co., Chicago, Ill.
Powell Co., Wm., Cincinnati, O.

VALVES, GATE, STEEL

Allegheny Valve Co., Warren, Pa.
Bordo Co., Inc., L. J., Glenside, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
De Zurik Shower Co., Sartell, Minn.
Edward Valves, East Chicago, Ind.
Everlasting Valve Co., Jersey City, N. J.
Fabri-Valve Co. of America, Portland, Ore.
Hamer Oil Tool Co., Long Beach, Calif.
Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lead Lined Iron Pipe Co., Wakefield, Mass. (lead lined)
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Ohio Injector Co., Wadsworth, O.
Okadee Co., Chicago, Ill.
Powell Co., Wm., Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Stockham Valves & Fittings Co., Birmingham, Ala.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, GLOBE, ALLOY

Alloy Steel Products Co., Linden, N. J.
Associated Valve & Engineering Co., Chicago, Ill.
Automatic Switch Co., Orange, N. J.
Carpenter Mfg. Corp., The, Cleveland, O.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Crane Co., Chicago, Ill.
Edward Valves, Inc., East Chicago, Ind.
Electric Steel Foundry Co., Portland, Ore.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis.
Jenkins Bros., New York, N. Y.
Lunkenheimer Co., Cincinnati, O.
Milwaukee Valve Co., Milwaukee, Wis.
Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., Cincinnati, O.
Strahman Valves, Inc., New York, N. Y.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Walworth Co., New York, N. Y.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, GLOBE, BRASS AND BRONZE

Automatic Switch Co., Orange, N. J.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Belknap Mfg. Co., Bridgeport, Conn.
Bowser, Inc., Fort Wayne, Ind.
California Brass Mfg. Co., Los Angeles, Calif.
Carpenter Mfg. Corp., The, Cleveland, O.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Cleveland Brass Mfg. Co., The, Cleveland, O.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
Detroit Brass & Malleable Wks., Detroit, Mich
Detroit Controls Corp., Detroit, Mich.
Fairbanks Co., The, New York, N. Y.
Grinnell Co., Inc., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
Hammond Brass Wks., Hammond, Ind.
Henry Valve Co., Melrose Park, Ill.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Jarecki Valve Div. of H. R. Porter Co., Inc., Tulsa, Okla.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marsh Heating Equipment Co., Skokie, Ill.
Marsh Valve Co., Dunkirk, N. Y.
Milwaukee Valve Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Morse-Smith-Morse, Inc., Watertown, Mass.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
OPW Corp., Cincinnati, O.
Ohio Brass Co., Mansfield, O.
Ohio Injector Co., Wadsworth, O.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Schaible Co., The, Cincinnati, O.
Stockham Valves & Fittings, Birmingham, Ala.
Strahman Valves, Inc., New York, N. Y.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Walworth Co., New York, N. Y.
White Flomatic Corp., Hoosick Falls, N. Y.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, GLOBE, IRON BODY

Automatic Switch Co., Orange, N. J.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Crane Co., Chicago, Ill.
Fairbanks Co., The, New York, N. Y.
Frick Co., Waynesboro, Pa.
Grinnell Co., Inc., Providence, R. I.
Hammel-Dahl Co., Providence, R. I.
Henry Valve Co., Melrose Park, Ill.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Lunkenheimer Co., Cincinnati, O.
Nason Co., Clarkston, Mich.
Ohio Injector Co., Wadsworth, O.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Stockham Valves & Fittings, Birmingham, Ala.
Strahman Valves, Inc., New York, N. Y.
Walworth Co., New York, N. Y.

VALVES, GLOBE, MALLEABLE IRON

Crane Co., Chicago, Ill.
Powell Co., Wm., Cincinnati, O.
Walworth Co., New York, N. Y.

VALVES, GLOBE, STEEL

Automatic Switch Co., Orange, N. J.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Crane Co., Chicago, Ill.
De Zurik Shower Co., Sartell, Minn.
Edward Valves, Inc., East Chicago, Ind.
Fabri-Valve Co. of America, Portland, Ore.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Henry Valve Co., Melrose Park, Ill.
Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Minneapolis-Honeywell Co., Industrial Div., Philadelphia, Pa.
Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Strahman Valves, Inc., New York, N. Y.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Velan Engineering Co., Havertown, Pa.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.

VALVES, INSTRUMENT

Associated Valve & Engineering Co., Chicago, Ill.
Automatic Switch Co., Orange, N. J.
Bristol Co., The, Waterbury, Conn.
Edward Valves, Inc., East Chicago, Ind.
Fisher Governor Co., Marshalltown, Ia.
Foxboro Co., Foxboro, Mass.
Hasco Valve & Machine Co., Milwaukee, Wis.
Hills-McCanna Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Ohio Injector Co., Wadsworth, O.
Penberthy Injector Co., Detroit, Mich.
Skinner Electric Valve Div., New Britain, Conn.
Trerice Co., H. O., Detroit, Mich.
Warren Engineering Co., Broadway, N. J.
Watts Regulator Co., Lawrence, Mass.
Weston Electrical Instrument Corp., Newark, N. J.

VALVES, LINED

American Hard Rubber Co., New York, N. Y. (Rubber lined)
Automatic Switch Co., Orange, N. J.
Cla-Val Co., Alhambra, Calif.
Conoflow Corp., Philadelphia, Pa.
Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
De Zurik Shower Co., Sartell, Minn.
Division Lead Co., Summit, Ill.
General Controls Co., Glendale, Calif., and Skokie, Ill.
Goodrich Co., B. F., Akron, O. (Rubber lined)
Grinnell Co., Inc., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
Hasco Valve & Machine Co., Milwaukee, Wis. (Rubber)
Hills-McCanna Co., Chicago, Ill.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead lined)
National Lead Co., New York, N. Y. (Lead)
Paul Valve Corp., New York, N. Y.
Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber)
Resisto Pipe & Valve Co., East Cambridge, Mass. (Lead)
Rockwell Co., W. S., Fairfield, Conn.
Rockwell Mfg. Co., Meter and Valve Div., Pittsburgh, Pa.
Saran Lined Pipe Co., Ferndale, Mich. (Saran lined)
Smith Co., S. Morgan, York, Pa.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.

VALVES, MIXING, HOT AND COLD WATER

Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Bell & Gossett Co., Morton Grove, Ill.
Crane Co., Chicago, Ill.
Dole Valve Co., The, Chicago, Ill.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
General Fittings Co., Providence, R. I.
Holby Valve Co., New York, N. Y.
Jordan Regulator Corp., Lebanon, O.
Lawler Automatic Controls, Inc., Mount Vernon, N. Y.
Leonard Valve Co., Cranston, R. I.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
Taco Heaters, Inc., Providence, R. I.
Trerice Co., H. O., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.
Watts Regulator Co., Lawrenceville, Mass.
Webster & Co., Warren, Camden, N. J.
Yula Water Heaters Inc., New York, N. Y.

VALVES, MIXING, STEAM AND WATER

Central Brass Mfg. Co., Cleveland, O.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Hammel-Dahl Co., Providence, R. I.
Johnson Service Co., Milwaukee, Wis.
Leonard Valve Co., Cranston, R. I.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls Inc., New York, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Vapor Heating Corp., Chicago, Ill.

VALVES, MOTOR OPERATED

Associated Valve & Engineering Co., Chicago, Ill.
Au-Temp-Co Corp., New York, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Barber-Colman Co., Rockford, Ill.
Barksdale Valves, Los Angeles, Calif.
Belco Industrial Equipment Div., Inc., Paterson, N. J.
Bell & Gossett Co., Morton Grove, Ill.
Bristol Co., The, Waterbury, Conn.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Cochrane Corp., Philadelphia, Pa.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
Cutler-Hammer, Inc., Milwaukee, Wis.
Darling Valve & Mfg. Co., Williamsport, Pa.
Davis Regulator Co., Chicago, Ill.
De Zurik Shower Co., Sartell, Minn.
Duriron Co., Inc., The, Dayton, O. (acid resisting)
Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
Edward Valves, Inc., East Chicago, Ind.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
General Controls Co., Glendale, Calif., and Skokie, Ill.
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Hammel-Dahl Co., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis.
Hills-McCanna Co., Chicago, Ill.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Jenkins Bros., New York, N. Y.
Keckley Co., O. C., Chicago, Ill.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Kieley & Mueller, Inc., Middletown, N. Y.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Mason-Neilan Regulator Co., Boston, Mass.
Mercoid Corp., Chicago, Ill.
Milwaukee Gas Specialty Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Nordstrom Valve Div., Rockwell Mfg. Co., Pittsburgh, Pa.
North American Mfg. Co., Cleveland, O.
Ohio Injector Co., Wadsworth, O.
Paul Valve Corp., New York, N. Y.
Penn Controls, Inc., Goshen, Ind.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Powell Co., Wm., Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Rensselaer Valve Co., Cohoes, N. Y.
Rockwell Co., W. S., Fairfield, Conn.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Smith Co., S. Morgan, York, Pa.
Stockham Valves & Fittings, Birmingham, Ala.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.
Webster & Co., Warren, Camden, N. J.
Wedgeplug Valve Co., Inc., New Orleans, La.
Weston Electrical Instrument Corp., Newark, N. J.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, NEEDLE

A-P Controls Corp., Milwaukee, Wis. (Oil)
Allin Mfg. Co., Inc., Chicago, Ill.
Alloy Steel Products Co., Linden, N. J. (Stainless steel)
American Meter Co., Inc., Philadelphia, Pa.
Associated Valve & Engineering Co., Chicago, Ill.
Carpenter Mfg. Corp., The, Cleveland, O. (Stainless steel stem, brass bar stock body)
Central Brass Mfg. Co., Cleveland, O.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Cooper Co., Clark, Palmyra, N. J.
Couplings Co., Chicago, Ill.
Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Detroit Brass & Malleable Wks., Detroit, Mich.
Detroit Controls Corp., Detroit, Mich.
Edward Valves, Inc., East Chicago, Ind.
Fairbanks Co., The, New York, N. Y.
Fisher Governor Co., Marshalltown, Ia.
Grove Regulator Co., Oakland, Calif.

Hammel-Dahl Co., Providence, R. I.
Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y.
Linde Air Products Co., A Div. of Union Carbide & Carbon Corp., New York, N. Y.
Lunkenheimer Co., Cincinnati, O.
Maid-O'-Mist, Inc., Chicago, Ill.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marsh Heating Equipment Co., Skokie, Ill.
Marsh Instrument Co., Skokie, Ill.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Modern Engineering Co., St. Louis, Mo.
Morrison Brothers Co., Dubuque, Ia.
Norgren Co., C. A., Englewood, Colo.
Ohio Brass Co., Mansfield, O.
Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Schaible Co., The, Cincinnati, O.
Star Stainless Screw Co., Paterson, N. J.
Stockham Valves & Fittings, Birmingham, Ala.
Superior Controls Co., Inc., Los Angeles, Calif.
Taylor Instrument Companies, Rochester, N. Y.
Vacuum-Electronic Engineering Co., New Hyde Park, L. I., N. Y.
Walworth Co., New York, N. Y.
Weatherhead Co., The, Cleveland, O.
Webster Electric Co., Racine, Wis. (Pressure regulating valve for oil burners)
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, OXYGEN

Fairbanks Co., The, New York, N. Y.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lunkenheimer Co., Cincinnati, O.
Modern Engineering Co., St. Louis, Mo.
Ohio Injector Co., Wadsworth, O.
Oxygen Equipment & Service Co., Chicago, Ill.
Stockham Valves & Fittings Co., Birmingham, Ala.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Walworth Co., New York, N. Y.

VALVES, PLASTIC

American Agile Corp., Bedford, O.
General Ceramics & Steatite Corp., Keasbey, N. J.
Hartwell & Son, Inc., H. N., Boston, Mass.
Haveg Corp., Newark, Del.
Hills-McCanna Co., Chicago, Ill.
Roylyn, Inc., Glendale, Calif.
Saran Lined Pipe Co., Ferndale, Mich.
Vanton Pump & Equipment Corp., New York, N. Y.

VALVES, PLUG

Alten Foundry & Machine Works, Inc., Lancaster, O.
American Car & Foundry Co., New York, N. Y.
Andale Co., Philadelphia, Pa.
Ardee Mfg. Co., Inc., Los Angeles, Calif.
Barrett, Haentjens & Co., Hazleton, Pa.
Barrett Machine Co., Pittsburgh, Pa.
Bordo Co., Inc., L. J., Glenside, Pa.
Carpenter Mfg. Corp., The, Cleveland, O.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Coen Co., San Francisco, Calif.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Cooper Co., Clark, Palmyra, N. J.
Corning Glass Works, Corning, N. Y.
Couplings Co., Chicago, Ill.
Crane Co., Chicago, Ill.
De Zurik Shower Co., Sartell, Minn. (rubber faced)
Duriron Co., Inc., Dayton, O. (Acid resisting)
Eddy Valve Co., Waterford, N. Y.
Edward Valves, Inc., East Chicago, Ind.
Faber Engineering Co., Inc., Philadelphia, Pa.
Fabri-Valve Co. of America, Portland, Ore.
Fairbanks Co., The, New York, N. Y.
General Ceramics & Steatite Corp., Keasbey, N. J. (Chemical stoneware & porcelain)
Gilbert Brass Foundry Co., St. Louis, Mo.
Hamer Oil Tool Co., Long Beach, Calif.
Hasco Valve & Machine Co., Milwaukee, Wis.
Hays Mfg. Co., Erie, Pa.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Knight, Maurice A., Akron, O. (Stoneware)
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Mueller Co., Decatur, Ill.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Nordstrom Valve Div., Rockwell Mfg. Co., Pittsburgh, Pa. (Lubricated)
Ohio Injector Co., Wadsworth, O.
Parks-Cramer Co., Fitchburg, Mass. (jacketed)
Pittsburgh Brass Mfg. Co., Pittsburgh, Pa.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Reynolds Shaffer Co., Detroit, Mich.
Rockwell Mfg. Co., Meter & Valve Div., Pittsburgh, Pa.
Rockwood Sprinkler Co., Worcester, Mass.
Saran Lined Pipe Co., Ferndale, Mich. (Saran lined)
Smith Co., S. Morgan, York, Pa.
Star Stainless Screw Co., Paterson, N. J.
Stockham Valves & Fittings, Birmingham, Ala.
Strahman Valves, Inc., New York, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Thermac Co., Los Angeles, Calif.
Tri-Clover Machine Co., Kenosha, Wis.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Walworth Co., New York, N. Y.
Weatherhead Co., The, Cleveland, O.
Wedgeplug Valve Co., Inc., New Orleans, La.
Welsbach Corp., The, Kitson Div., Philadelphia, Pa.
Whittaker Co., Wm. R., Los Angeles, Calif.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, PRESSURE REDUCING AND REGULATING, AIR AND GAS

American Car & Foundry Co., New York, N. Y.
A-P Controls Corp., Milwaukee, Wis.
Associated Valve & Engineering Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Bellows Co., The, Akron, O.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Boylston Steam Specialty Co., Chicago, Ill.
Bristol Co., The, Waterbury, Conn.
CCA Products, Inc., Glendale, Calif.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Central Brass Mfg. Co., Cleveland, O.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Clark Mfg. Co., Cleveland, O.
Conoflow Corp., Philadelphia, Pa.
Copes-Vulcan Div., Continental Foundry & Machine Co., Erie, Pa.
Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Defender Instrument & Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
DeVilbiss Co., The, Toledo, O.
Dockson Corp., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Electric Sprayit Co., The, Sheboygan, Wis.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
General Controls Co., Glendale, Calif., and Skokie, Ill.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
Hagan Corp., Pittsburgh, Pa.
Hammel-Dahl Co., Providence, R. I.
Harris Calorific Co., The, Cleveland, O.
Hasco Valve & Machine Co., Milwaukee, Wis.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Hubbell Corp., Mundelein, Ill.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Jordan Regulator Corp., Lebanon, O.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., Middletown, N. Y.
Klipfel Valves, Inc., Hamilton, O.
Kunkle Valve Co., Ft. Wayne, Ind.
Leslie Co., Lyndhurst, N. J.
Liquid Carbonic Corp., The, Chicago, Ill.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Regulator Co., Boston, Mass.
Maxitrol Co., Detroit, Mich.
McAlear Mfg. Co., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia. Pa.
Modern Engineering Co., St. Louis, Mo.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Norgren Co., C. A., Englewood, Colo.
Norwalk Valve Co., South Norwalk, Conn.
Penn Controls, Inc., Goshen, Ind.
Powers Regulator Co., Skokie, Ill.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.

Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., Cleveland, O.
Staples & Pfeiffer, San Francisco, Calif.
Strong, Carlisle & Hammond Co., Cleveland, O.
Sullivan Valve & Engineering Co., Butte, Mont.
Swartwout Co., The, Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.
Thrush & Co., H. A., Peru, Ind.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Tryco Products, Inc., Westfield, Mass.
Warren Engineering Co., Broadway, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Weston Electrical Instrument Corp., Newark, N. J.

VALVES, PRESSURE REDUCING AND REGULATING, HOT WATER

A-P Controls Corp., Milwaukee, Wis.
Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Bell & Gossett Co., Morton Grove, Ill.
Boylston Steam Specialty Co., Chicago, Ill.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Cla-Val Co., Alhambra, Calif.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Copes-Vulcan Div., Continental Foundry & Machine Co., Erie, Pa.
Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Dunham Co., C. A., Chicago, Ill.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
General Controls Co., Glendale, Calif.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Jordan Regulator Corp., Lebanon, O.
Kainer & Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., Middletown, N. Y.
Klipfel Valves, Inc., Hamilton, O.
Kunkle Valve Co., Ft. Wayne, Ind.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Powers Regulator Co., Skokie, Ill.
Republic Flow Meters Co., Chicago, Ill.
Sall Bros. Co., Rockford, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schaible Co., The, Cincinnati, O.
Spence Engineering Co., Inc., Walden, N .Y.
Stickle Steam Specialties Co., Indianapolis, Ind.
Strong, Carlisle & Hammond Co., Cleveland, O.
Swartwout Co., The, Cleveland, O.
Taco Heaters, Inc., Providence, R. I.
Taylor Instrument Companies, Rochester, N. Y.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, LaCrosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Vapor Heating Corp., Chicago, Ill.
Warren Engineering Co., Broadway, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Weston Electrical Instrument Corp., Newark, N. J.
White Flomatic Corp., Hoosick Falls, N. Y.

VALVES, PRESSURE REDUCING AND REGULATING, STEAM

Associated Valve & Engineering Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Black-Sivall & Bryson, Inc., Kansas City, Mo.
Boylston Steam Specialty Co., Chicago, Ill.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Clark Mfg. Co., Cleveland, O.
Conoflow Corp., Philadelphia, Pa.
Copes-Vulcan Div., Continental Foundry & Machine Co., Erie, Pa.
Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Dunham Co., C. A., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fischer Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
General Controls Co., Glendale, Calif.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
Hagan Corp., Pittsburgh, Pa.
Hammel-Dahl Co., Providence, R. I.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Chicago, Ill.
Jordan Regulator Corp., Lebanon, O.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., Middletown, N. Y.
Klipfel Valves, Inc., Hamilton, O.
Kunkle Valve Co., Ft. Wayne, Ind.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Powers Regulator Co., Skokie, Ill.
Republic Flow Meters Co., Chicago, Ill.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schutte and Koerting Co., Cornwells Heights, Buck County, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., Cleveland, O.
Staples & Pfeiffer, San Francisco, Calif.
Stickle Steam Specialties Co., Indianapolis, Ind.
Strong, Carlisle & Hammond Co., Cleveland, O.
Swartwout Co., The, Cleveland, O.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corps., Indianapolis, Ind.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.
Warren Engineering Co., Broadway, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Weston Electrical Instrument Corp., Newark, N. J.

VALVES, PUMP

Anchor Packing Co., Philadelphia, Pa.
Burrows Mfg. Co., F. A., York, Pa.
Dick Co., Inc., R. & J., Passaic, N. J.
Durabla Mfg. Co., New York, N. Y.
Farris Engineering Corp., Palisades Park, N. J.
Fisher Governor Co., Marshalltown, Ia.
Garlock Packing Co, Palmyra, N. Y.
Goodrich Co., B. F., Akron, O.
Jacuzzi Bros., Inc., Richmond, Calif.
Madden Corp., The, Chicago, Ill.
New York Belting & Packing Co., Passaic, N. J.
Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Philadelphia, Pa.
United States Rubber Company, New York, N. Y.
White Flomatic Corp., Hoosick Falls, N. Y.
Williams Gauge Co., The, Pittsburgh, Pa.

VALVES, RADIATOR, AIR

Anderson Products, Inc., Cambridge, Mass.
Beaton & Caldwell Mfg. Co., New Britain, Conn. (for venting hot water radiators)
Beaton & Corbin Mfg. Co., Southington, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
Chicago Specialty Mfg. Co., Chicago, Ill.
Detroit Controls Corp., Detroit, Mich.
Dole Valve Co., The, Chicago, Ill.
G & H Mfg. Co., Philadelphia, Pa.
Gorton Heating Co., Cranford, N. J.
Heat Timer Corp., New York, N. Y.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Keeney Mfg. Co., Newington, Conn.
Maid-O'-Mist, Inc., Chicago, Ill.
Majot Automatic Machine Co., Inc., East Orange, N. J.
McAlear Mfg. Co., Chicago, Ill.
Moreheat Distribution, Inc., Cincinnati, O.
New York Air Valve Corp., Brooklyn, N. Y.
Positive Control Co., The, Cincinnati, O.
Quality Specialty Co., Inc., Camden, N. J.
Radiator Valve Co. of America, Philadelphia, Pa.
Riggio Co., Frank D., Rutherford, N. J.
Schaible Co., The, Cincinnati, O.
Sullivan Valve & Engineering Co., Butte, Mont.
Taco Heaters, Inc., Providence, R. I.
Thrush & Co., H. A., Peru, Ind.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, ELECTRIC

Barber-Colman Co., Rockford, Ill.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville Tenn.
General Controls Co., Glendale, Calif., and Skokie, Ill.
Jenkins Bros., New York, N. Y.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Sarcotherm Controls, Inc., New York, N. Y.
Vapor Heating Corp., Chicago, Ill.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, PACKLESS

Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, PNEUMATIC

Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Powers Regulator Co., Skokie, Ill.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, SELF-CONTAINED

Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville. Tenn.
General Controls Co., Glendale, Calif., and Skokie, Ill.
Majot Automatic Machine Co., Inc., East Orange, N. J.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn
Sarco Co., Inc., New York, N. Y.
Sterling, Inc., Milwaukee, Wis.
Trane Co., The, LaCrosse, Wis.

VALVES, RADIATOR, ORIFICE

Barnes & Jones, Inc., Boston, Mass.
Cashin Co., W. D., Boston, Mass.
Dunham Co., C. A., Chicago, Ill.
Grinnell Co., Inc., Providence, R. I.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Jenkins Bros., New York, N. Y.
Marsh Valve Co., Dunkirk, N. Y.
New York Air Valve Corp., Brooklyn, N. Y.
Sarco Co , Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Simplex Heating Specialty Co., Inc., Lynchburg, Va.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Trane Co., The, LaCrosse, Wis.
Webster & Co., Warren, Camden, N. J.

VALVES, RADIATOR, STEAM AND HOT WATER, HAND

Barnes & Jones, Inc., Boston, Mass.
Bishop & Babcock Mfg. Co., Cleveland, O.
Cashin Co., W. D., Boston, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Crane Co., Chicago, Ill.
Detroit Controls Corp., Detroit, Mich.
Dunham Co., C. A., Chicago, Ill.
Fairbanks Co., The, New York, N. Y.
Haines & Co., Inc., William S., Div. Sellers Injector Corp., Philadelphia, Pa
Hammond Brass Wks., Hammond, Ind.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Marsh Heating Equipment Co., Skokie, Ill.
Marsh Valve Co., Dunkirk, N. Y.
Milwaukee Valve Co., Milwaukee, Wis.
Ohio Brass Co., Mansfield, O.
Powell Co., Wm., Cincinnati, O.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
Scott Valve Mfg. Co., Detroit, Mich.
Sterling, Inc., Milwaukee, Wis.
Trane Co., The, La Crosse, Wis.
United States Radiator Corp., Detroit, Mich.
Webster & Co., Warren, Camden, N. J.

VALVES, RADIATOR, STEAM AND HOT WATER, MODULATING

Barnes & Jones, Inc., Boston, Mass.
Bishop & Babcock Mfg. Co., Cleveland, O.
Cashin Co., W. D., Boston, Mass.
Dunham Co., C. A., Chicago, Ill.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Haines & Co., Inc., William S., Div. Sellers Injector Corp., Philadelphia, Pa
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., Chicago, Ill.
Jenkins Bros., New York, N. Y.
Johnson Service Co., Milwaukee, Wis.
Marsh Heating Equipment Co., Skokie, Ill.
Marsh Valve Co., Dunkirk, N. Y.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Ohio Brass Co., Mansfield, O.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Sterling, Inc., Milwaukee, Wis.
Vapor Specialty Co., New York, N. Y.
Webster & Co., Warren, Camden, N. J.

VALVES, REFRIGERATION (ANGLE, CHECK, GATE, GLOBE, NEEDLE, RELIEF)

A-P Controls Corp., Milwaukee, Wis.
Bakeraire Corp., South Windham, Me.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Central Brass Mfg. Co., Cleveland, O.
Crane Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Hammel-Dahl Co., Providence, R. I.
Henry Valve Co., Melrose Park, Ill.
Hills-McCanna Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lunkenheimer Co., Cincinnati, O.
Marsh Instrument Co., Skokie, Ill.
Mueller Brass Co., Port Huron, Mich.
Reynolds Mfg. Co., Inc., Springfield, Mo.
Shank Co., Cyrus, Cicero, Ill.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Techniflex Corp., Port Jervis, N. Y.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Worthington Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.

VALVES, REFRIGERATION, BACK PRESSURE

A-P Controls Corp., Milwaukee, Wis.
Alco Valve Co., St. Louis, Mo.
Aminco Refrigeration Products Co., Detroit, Mich.
Bailey Co., Chas. M., San Francisco, Calif.
Bakeraire Corp., South Windham, Me.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Electrimatic Co., Sales Affiliate, Jas. P. Marsh Corp., Skokie, Ill.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Frigidaire Div., General Motors Corp., Dayton, O
General Controls Co., Glendale, Calif., and Skokie, Ill.
Hammel-Dahl Co., Providence, R. I.
Hubbell Corp., Mundelein, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Lonergan Co., J. E., Philadelphia, Pa.
Mueller Brass Co., Port Huron, Mich.
Schnacke, Inc., Evansville, Ind.
Temprite Products Corp., Birmingham, Mich.
Vilter Mfg. Co., The, Milwaukee, Wis.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.

VALVES, REFRIGERATION, EXPANSION, CONSTANT PRESSURE

A-P Controls Corp., Milwaukee, Wis.
Alco Valve Co., St. Louis, Mo.
Aminco Refrigeration Products Co., Detroit, Mich.
Bakeraire Corp., South Windham, Me.
Cash Co., A. W., Decatur, Ill.
Crane Co., Chicago, Ill.
Detroit Controls Corp., Detroit, Mich.
Foster Engineering Co., Union, N. J.
Frigidaire Div., General Motors Corp., Dayton, O
General Controls Co., Glendale, Calif., and Skokie, Ill.
Hammel-Dahl Co., Providence, R. I.
Hubbell Corp., Mundelein, Ill.
Lonergan Co., J. E., Philadelphia, Pa.
Mayson Mfg. Co., Detroit, Mich.
Sporlan Valve Co., St. Louis, Mo.
Tenney Engineering, Inc., Newark, N. J.
Vilter Mfg. Co., The, Milwaukee, Wis.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.

VALVES, REFRIGERATION, EXPANSION, THERMOSTATIC

A-P Controls Corp., Milwaukee, Wis.

Alco Valve Co., St. Louis, Mo.
Cutler-Hammer Inc., Milwaukee, Wis.
Detroit Controls Corp., Detroit, Mich.
Frigidaire Div., General Motors Corp., Dayton, O.
General Controls Co., Glendale, Calif., and Skokie, Ill.
Mayson Mfg. Co., Detroit, Mich.
Peerless of America, Inc., Chicago, Ill.
Sporlan Valve Co., St. Louis, Mo.
Tenney Engineering, Inc., Newark, N. J.
Vilter Mfg. Co., The, Milwaukee, Wis.
X L Refrigerating Co., Chicago, Ill.

VALVES, REFRIGERATION, FLOAT, HIGH PRESSURE

Alco Valve Co., St. Louis, Mo.
Aminco Refrigeration Products Co., Detroit, Mich.
Armstrong Machine Works, Three Rivers, Mich.
Foster Engineering Co., Union, N. J.
Frick Co., Waynesboro, Pa.
Hubbell Corp., Mundelein, Ill.
Mercoid Corp., Chicago, Ill.
Phillips & Co., H. A., Chicago, Ill.
Temprite Products Corp., Birmingham, Mich.
Vilter Mfg. Co, Milwaukee, Wis.
Wabash Mfg. Co., Chicago, Ill.
Worthington Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
York Corp., York, Pa.

VALVES, REFRIGERATION, FLOAT, HIGH PRESSURE AND LOW PRESSURE

Aminco Refrigeration Products Co., Detroit, Mich.
Mayson Mfg. Co., Detroit, Mich.
Phillips & Co., H. A., Chicago, Ill.
Temprite Products Corp., Birmingham, Mich.
Vilter Mfg. Co., Milwaukee, Wis.
Voss Co., J. H. H., Inc., New York, N. Y.
York Corp., York, Pa.

VALVES, REFRIGERATION, LIQUID CONTROL, FLOAT PILOTED

Alco Valve Co., St. Louis, Mo.
Cooper Co., Clark, Palmyra, N. J.
Frick Co., Waynesboro, Pa.
Magnetro, Inc., Chicago, Ill.
Phillips & Co., H. A., Chicago, Ill.
York Corp., York, Pa.

VALVES, REFRIGERATION, MAGNETIC STOP

A P Controls Corp., Milwaukee, Wis.
Alco Valve Co., St. Louis, Mo.
Automatic Switch Co., Orange, N. J.
Detroit Controls Corp., Detroit, Mich.
Electrimatic Co., Sales Affiliate, Jas. P. Marsh Corp., Skokie, Ill.
Frick Co., Waynesboro, Pa.
General Controls Co., Glendale, Calif., and Skokie, Ill.
Hubbell Corp., Mundelein, Ill.
Mercoid Corp., Chicago, Ill.
Penn Controls, Inc., Goshen, Ind.
Sporlan Valve Co., St. Louis, Mo.

VALVES, REFRIGERATION, TEMPERATURE REGULATING OR SNAP ACTION SUCTION

Alco Valve Co., St. Louis, Mo.
Aminco Refrigeration Products Co., Detroit, Mich.
Frigidaire Div., General Motors Corp., Dayton, O.
Temprite Products Corp., Birmingham, Mich.

VALVES, REFRIGERATION, WATER REGULATING, PRESSURE OR TEMPERATURE ACTUATED

A-P Controls Corp., Milwaukee, Wis.
Aminco Refrigeration Products Co., Detroit. Mich.
Art Valve Co., Chicago, Ill.
Bailey Co., Chas. M., San Francisco, Calif.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Cooper Co., Clark, Palmyra, N. J.
Electrimatic Co., Sales Affiliate, Jas. P. Marsh Corp., Skokie, Ill.
Farris Engineering Corp., Palisades Park, N. J.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Frigidaire Div., General Motors Corp., Dayton, O.
Jordan Regulator Corp., Lebanon, O.
Klipfel Mfg. Co., Hamilton, O.
Mayson Mfg. Co., Detroit, Mich.
Mercoid Corp., Chicago, Ill.
Penn Controls, Inc., Goshen, Ind.
Perfection Refrigeration Parts Co., Harvey, Ill
Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N Y
Spence Engineering Co., Inc., Walden, N. Y.

Weston Electrical Instrument Corp., Newark, N. J.
York Corp., York, Pa.

VALVES, RELIEF, HOT WATER, COMBINED PRESSURE AND TEMPERATURE OPERATED

Atlas Valve Co., Newark, N. J.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Cooper Co., Clark, Palmyra, N. J.
Fisher Govenor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Kainer & Co., Chicago, Ill.
Leslie Co., Lyndhurst, N. J.
McDonnell & Miller, Inc., Chicago, Ill.
Mueller Co., Decatur, Ill.
Patrol Valve Co., The, Cleveland. O.
Quality Specialty Co., Inc., Camden, N. J.
Sall Bros. Co., Rockford, Ill.
Schaible Co., The, Cincinnati, O.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass
Thrush & Co., H. A. Peru, Ind.
Trane Co., The, La Crosse, Wis.
Watts Regulator Co., Lawrence, Mass.
Welsbach Corp., The, Kitson Div., Philadelphia, Pa.

VALVES, RELIEF, HOT WATER, PRESSURE OPERATED

Ashton Valve Co., Wrentham, Mass.
Bailey Co., Chas. M., San Francisco, Calif.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Bell & Gossett Co., Morton Grove, Ill.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Central Brass Mfg. Co., Cleveland, O.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Dunham Co., C. A., Chicago, Ill.
Durabla Mfg. Co., New York, N. Y.
Eddy Valve Co., Waterford, N. Y.
Edward Valves, Inc., East Chicago, Ind.
Farris Engineering Corp., Palisades Park, N. J.
Fisher Governor Co., Marshalltown, Ia.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Jordan Regulator Corp., Lebanon, O.
Kainer & Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Klipfel Valves, Inc., Hamilton, O.
Kunkle Valve Co., Ft. Wayne, Ind.
Leslie Co., Lyndhurst, N. J.
Lonergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marine & Industrial Products Co., Philadelphia, Pa.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Patrol Valve Co., The, Cleveland, O.
Quality Specialty Co., Inc., Camden, N. J.
Sall Bros. Co., Rockford, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schaible Co., The, Cincinnati, O.
Scott Valve Mfg. Co., Detroit, Mich.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass
Staples & Pfeiffer, San Francisco, Calif.
Swartwout Co., The, Cleveland, O.
Taco Heaters, Inc., Providence, R. I.
Texsteam Corp., Houston, Tex.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, La Crosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Tryco Products, Inc., Westfield, Mass.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Welsbach Corp., The, Kitson Div., Philadelphia, Pa.
Weston Electrical Instrument Corp., Newark, N. J.

VALVES, RELIEF, HOT WATER, PRESSURE OPERATED, SELF-FILLING

Bailey Co., Chas. M., San Francisco, Calif.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Bell & Gossett Co., Morton Grove, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Crane Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Klipfel Valves, Inc., Hamilton, O.
McDonnell & Miller, Inc., Chicago, Ill.
Mueller Co., Decatur, Ill.
Quality Specialty Co., Inc., Camden, N. J.

Sall Bros. Co., Rockford, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Thrush & Co., H. A., Peru, Ind.
Watts Regulator Co., Lawrence, Mass.

VALVES, RELIEF, HYDRAULIC

Ashton Valve Co., Wrentham, Mass.
Associated Valve & Engineering Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Blackhawk Mfg. Co., Milwaukee, Wis.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Cla-Val Co., Alhambra, Calif.
Cooper Co., Clark, Palmyra, N. J.
Commercial Shearing & Stamping Co., Youngstown, O.
Crosby Steam Gage & Valve Co., Wrentham, Mass.
Farris Engineering Corp., Palisades Park, N. J.
Foster Engineering Co., Union, N. J.
Fulflo Specialties Co., Inc., The, Blanchester, O.
General Controls Co., Glendale, Calif.
Golden-Anderson Specialty Co., Pittsburgh, Pa.
Keckley Co., O. C., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Kunkle Valve Co., Ft. Wayne, Ind.
Linde Air Products Co., A Div. of Union Carbide & Carbon Corp., New York, N. Y.
Lonergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marine & Industrial Products Co., Philadelphia, Pa.
McDonnell & Miller, Inc., Chicago, Ill.
Pantex Mfg. Corp., Hydraulic Div., Pawtucket, R. I.
Ross Valve Mfg. Co., Troy, N. Y.
Scott Valve Mfg. Co., Detroit, Mich.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.

VALVES, RELIEF, OIL

American Car & Foundry Co., New York, N. Y.
Andale Co., Philadelphia, Pa.
Ashton Valve Co., Wrentham, Mass.
Associated Valve & Engineering Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
Crosby Steam Gage & Valve Co., Wrentham, Mass.
Davis Regulator Corp., Chicago, Ill.
Durabla Mfg. Co., New York, N. Y.
Edward Valves, Inc., East Chicago, Ind.
Farris Engineering Corp., Palisades Park, N. J.
Fisher Governor Co., Marshalltown, Ia.
Fulflo Specialties Co., Inc., The, Blanchester, O.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Greer Hydraulics, Inc., Brooklyn, N. Y.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Hubbell Corp., Mundelein, Ill.
James-Pond-Clark, Pasadena, Calif.
Keckley Co., O. C., Chicago, Ill.
Klipfel Valves, Inc., Hamilton, O.
Kunkle Valve Co., Ft. Wayne, Ind.
Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y.
Locke Regulator Co., Salem, Mass.
Lonergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marine & Industrial Products Co., Philadelphia, Pa.
McDonnell & Miller, Inc., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Morrison Brothers Co., Dubuque, Ia.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Pantex Mfg. Corp., Hydraulics Div., Pawtucket, R. I.
Preferred Utilites Mfg. Corp., New York, N. Y.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Skinner Electric Valve Div., New Britain, Conn.
Staples & Pfeiffer, San Francisco, Calif.
Texsteam Corp., Houston, Tex.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Watson & McDaniel Co., Philadelphia, Pa.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, SADDLE

Beckett & Co., Inc., Thomas, Dallas, Tex.
Darling Valve & Mfg. Co., Williamsport, Pa.
Fairbanks Co., The, New York, N. Y.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Maid-O'-Mist, Inc., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Okadee Co., Chicago, Ill.
Walworth Co., New York, N. Y.

VALVES, SAFETY CLEANOUT

Liquidepth Indicators, Inc., Long Island City, N. Y.

VALVES, SAFETY, STEAM

American Car & Foundry Co., New York, N. Y.
Ashton Valve Co., Wrentham, Mass.
Associated Valve & Engineering Co., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
Crosby Steam Gage & Valve Co., Wrentham, Mass.
Eclipse Fuel Engineering Co., Rockford, Ill.
Farris Engineering Corp., Palisades Park, N. J
Foster Engineering Co., Union, N. J.
Keckley Co., O. C., Chicago, Ill.
Kunkle Valve Co., Ft. Wayne, Ind.
Lonergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marine & Industrial Products Co., Philadelphia, Pa.
North American Mfg. Co., Cleveland, O.
Powell Co., Wm., Cincinnati, O.
Scott Valve Mfg. Co., Detroit, Mich.
Texsteam Corp., Houston, Tex.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Vapor Heating Corp., Chicago, Ill.
Vernon Tool Co., Ltd., Alhambra, Calif.

VALVES, SLIDE

Barksdale Valves, Los Angeles, Calif.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Faber Engineering Co., Inc., Philadelphia, Pa.
General Ceramics & Steatite Corp., Keasbey, N. J. (chemical stoneware)
Morganite, Inc., Carbon Specialties Div., Long Island City, N. Y.
Ohio Injector Co., Wadsworth, O.
Rockwell Co., W. S., Fairfield, Conn.
Smith, S. Morgan, York, Pa.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, SOLDER JOINT

American Brass Co., Waterbury, Conn.
Central Brass Mfg. Co., Cleveland, O.
Chase Brass & Copper Co., Waterbury, Conn.
Cleveland Brass Mfg. Co., The, Cleveland, O.
Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Fairbanks Co., The, New York, N. Y. (also brazed-end)
Hammond Brass Works, Hammond, Ind.
Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Ohio Brass Co., Mansfield, O.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
R-P & C Valve Div., Reading, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Walworth Co., New York, N. Y. (Brazed)

VALVES, SOLENOID

A-P Controls Corp., Milwaukee, Wis.
Alco Valve Co., St. Louis, Mo.
Associated Valve & Engineering Co., Chicago, Ill.
Atkomatic Valve Co., Indianapolis, Ind.
Automatic Switch Co., Orange, N. J.
Barber-Colman Co., Rockford, Ill.
Barksdale Valves, Los Angeles, Calif.
Bellows Co., The, Akron, O.
Cla-Val Co., Alhambra, Calif.
Cooper Co., Clark, Palmyra, N. J.
Copes-Vulcan Div., Continental Foundry & Machine Co., Erie, Pa.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis Regulator Co., Chicago, Ill.
Detroit Controls Corp., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Electrimatic Co., Sales Affiliate, Jas. P. Marsh Corp., Skokie, Ill.
Erickson Specialty Co., Cohoes, N. Y.
Frick Co., Waynesboro, Pa.
General Controls Co., Glendale, Calif. and Skokie, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
Hanna Engineering Wks., Chicago, Ill.
Hasco Valve & Machine Co., Milwaukee, Wis. (alloy)
Hays Mfg. Co., Erie, Pa.
Hook & Ackerman, Inc., New York, N. Y.
Hubbell Corp., Mundelein, Ill.
Hunt & Son, Inc., C. B., Salem, O.
Jackes-Evans Mfg. Co., Controls Div., St. Louis, Mo.

Johnson Corp., The, Three Rivers, Mich.
Keckley Co., O. C., Chicago, Ill.
Lammert & Mann Co., Chicago, Ill. (Gas safety shut-off)
Ledeen Mfg. Co., Los Angeles, Calif.
Locke Regulator Co., Salem, Mass.
McDonnell & Miller, Inc., Chicago, Ill.
McQuay-Norris Mfg. Co., St. Louis, Mo.
McRae Corp., Los Angeles, Calif.
Milwaukee Gas Specialty Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Paul Valve Corp., New York, N. Y.
Penn Controls, Inc., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Pfening Co., Fred D., Columbus, O. (water and steam)
Rockwell Mfg. Co., Meter & Valve Div., Pittsburgh, Pa.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Skinner Electric Valve Div., New Britain, Conn.
Smith Co., S. Morgan, York, Pa.
Soreng Products Corp., Schiller Park, Ill.
Spence Engineering Co., Walden, N. Y.
Sporlan Valve Co., St. Louis, Mo.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Superior Controls Co., Inc., Los Angeles, Calif.
Supreme Electric Products Corp., Rochester, N. Y.
Taylor-Winfield Corp., Warren, O.
Vacuum-Electronic Engineering Co., New Hyde Park, L. I., N. Y.
Vapor Heating Corp., Chicago, Ill.
White-Rodgers Electric Co., St. Louis, Mo.

VALVES, STEAM-JACKETED

Barrett Machine Co., Pittsburgh, Pa.
Cooper Co., Clark, Palmyra, N. J.
De Zurik Shower Co., Sartell, Minn.
Everlasting Valve Co., Jersey City, N. J.
Fisher Governor Co., Marshalltown, Ia.
Hammel-Dahl Co., Providence, R. I.
Red Jacket Co., Inc., Pittsburgh, Pa.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Wedgeplug Valve Co., Inc., New Orleans, La.

VALVES, 2, 3 AND 4 WAY

Alco Valve Co., St. Louis, Mo.
Alten Foundry & Machine Works, Inc., Lancaster, O.
American Car & Foundry Co., New York, N. Y.
Automatic Switch Co., Orange, N. J.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Barber-Colman Co., Rockford, Ill.
Barksdale Valves, Los Angeles, Calif.
Bellows Co., The, Akron, O.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Bordo Co., Inc., L. J., Glenside, Pa.
Bristol Co., The, Waterbury, Conn.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Clark Controller Co., Cleveland, O.
Cla-Val Co., Alhambra, Calif.
Cooper Co., Clark, Palmyra, N. J.
Commercial Shearing & Stamping Co., Youngstown, O.
Crane Co., Chicago, Ill.
Davis Engineering Corp., Elizabeth, N. J.
Davis Regulator Co., Chicago, Ill.
Detroit Brass & Malleable Works, Detroit, Mich.
Detroit Controls Corp., Detroit, Mich.
De Zurik Shower Co., Sartell, Minn.
Duriron Co., Inc., The, Dayton, O. (acid resisting)
Fisher Governor Co., Marshalltown, Ia.
General Controls Co., Glendale, Calif. and Skokie, Ill.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Hanna Engineering Wks., Chicago, Ill.
Henry Valve Co., Melrose Park, Ill.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Hunt & Son, Inc., C. B., Salem, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Keller Tool Co., Grand Haven, Mich.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lunkenheimer Co., Cincinnati, O.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Mercoid Corp., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Nordstrom Valve Div., Rockwell Mfg. Co., Pittsburgh, Pa.
Penn Controls, Inc., Goshen, Ind.
Permutit Co., New York, N. Y.
Powell Co., Wm., Cincinnati, O.
Powers Regulator Co., Skokie, Ill.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Rockwell Co., W. S., Fairfeld, Conn.
Rockwell Mfg. Co., Meter and Valve Div., Pittsburgh, Pa.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Sarcotherm Controls, Inc., New York, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Skinner Electric Valve Div., New Britain, Conn.
Smith Co., S. Morgan, York, Pa.
Taylor Instrument Companies, Rochester, N. Y.
Taylor-Winfield Corp., Warren, O.
Wach Co., E. H., The, Chicago, Ill.
Walworth Co., New York, N. Y. (Lubricated plug valves)
Warren Engineering Co., Broadway, N. J.
Weatherhead Co., The, Cleveland, O.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, WATER GAGE

Associated Valve & Engineering Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Lunkenheimer Co., Cincinnati, O.
New York Air Valve Corp., Brooklyn, N. Y.
Reliance Guage Column Co., Cleveland, O.
Superior Controls Co., Inc., Los Angeles, Calif.

VANES, DUCT TURNING, PREFABRICATED

Anemostat Corp. of America, New York, N. Y. (Equalizing deflectors)
Barber-Colman Co., Rockford, Ill.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Duro-Dyne Corp., Hempstead, L. I., N. Y.
Elgen Mfg. Corp., Long Island City, N. Y.
Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Titus Mfg. Corp., Waterloo, Ia.
Tuttle & Bailey, Inc., New Britain, Conn.

VAPOR HEATING SYSTEMS

See Systems, Heating, Vapor

VAPORIZERS FOR PROPANE — BUTANE

Davis Engineering Corp., Elizabeth, N. J.
Mitchell Co., John E., Dallas, Tex.

VARIABLE SPEED DRIVES

See Changers, Speed, Hydraulic Coupling; Changers, Speed, Mechanical; Reducers, Speed; Pulleys and Sheaves, for Belt Drives

VARIABLE SPEED PULLEYS

See Changers, Speed, Mechanical

V-BELT DRIVES

See Drives, V-Belt

VELOCITY REGULATORS

See Regulators, Air Velocity

VENT FLUE CAPS

See Caps, Vent Flue

VENTILATING HOSE

See Ducts and Duct Fittings, Prefabricated, Non-Metallic

VENTILATION HEATERS

See Surface, Finned, Heating; Ventilators, Roof, Fan; Ventilators, Unit

VENTILATORS, MUSHROOM

Brighton-Dickinson Div., Chicago, Ill.
Carnes Co., W. R., Verona, Wis.
Chicago Blower Corp., Franklin Park, Ill.
Cook Co., Loren, Berea, O.
De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Knight, Maurice A., Akron, O. (Stoneware)
Knowles Mushroom Ventilator Co., Upper Montclair, N. J.
Lumm Co., A. H., Toledo, O.
Muckle Mfg. Co., Owatonna, Minn.
Penn Ventilator Co., Philadelphia, Pa.
Van Noorden Co., E., Boston, Mass.

VENTILATORS, ROOF, FAN

Acme Equipment Co., Muskogee, Okla.
Aerovent Fan Co., Inc., Piqua, O.
Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
Aladdin Heating Corp., San Leandro, Calif.
Allen Ventilator Div., Production Planning Co., Rochester, Minn.
American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Blower Corp., Detroit, Mich.
American-Larson Ventilation Co., Pittsburgh, Pa.
American Steel Band Co., Pittsburgh, Pa.
Ammerman Co., C. L., Minneapolis, Minn.
Arex Co., Chicago, Ill.
Bar-Brook Mfg. Co., Inc., Shreveport, La.
Bertram Co., Harvey P., The, Cincinnati, O.

Bishop & Babcock Mfg. Co., Cleveland, O.
Breidert Co., G. C., Los Angeles, Calif.
Brighton-Dickinson Div., Chicago, Ill.
Burt Mfg. Co., Akron, O.
Carnes Co., W. R., Verona, Wis.
Century Fan & Ventilator Co., Stamford, Conn.
Chelsea Fan & Blower Co., Inc., Plainfield, N. J.
Chicago Blower Corp., Franklin Park, Ill.
Clay Equipment Corp., Cedar Falls, Ia.
Cook Co., Loren, Berea, O.
Dana Fan & Blower Corp., Cincinnati, O.
Davidson Hyduty Roof Fan Co., Newton, Mass.
De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Empire Ventilation Equipment Co., Long Island City, N. Y.
Gallaher Co., The, Owatonna, Minn., & Omaha, Neb.
Gehri Co., Tacoma, Wash.
General Blower Co., Morton Grove, Ill.
Hartzell Propeller Fan Co., Piqua, O.
Hayes Furnace Mfg. & Supply Co., Los Angeles, Calif.
Heating Assurance, Inc., Spokane, Wash.
Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Ilg Electric Ventilating Co., Chicago, Ill.
International Engineering, Inc., Dayton, O.
Iona Ventilator Co., Inc., Philadelphia, Pa.
Iron Lung Ventilator Co., Cleveland, O.
Jeffrey Mfg. Co., Columbus, O.
Jenn-Air Products Co., Indianapolis, Ind.
Jordan & Co., Inc., Paul R., Indianapolis, Ind.
King Co., The, Owatonna, Minn.
Kody Blower Co., Trenton, N. J.
Lee & Son Co., Thomas, Cincinnati, O.
Lumm Co., A. H., Toledo, O.
M & E Mfg. Co., Indianapolis, Ind.
Martin Fan & Blower Co., Chicago, Ill.
Mefco Mfg. Co., Air Conditioning Div., Glendale, Calif.
Mellish & Murray Co., Chicago, Ill.
Mountain States Equipment Co., Denver, Colo.
Muckle Mfg. Co., Owatonna, Minn.
New York Blower Co., Chicago, Ill.
Newcomb-Detroit Co., Detroit, Mich.
Octagon Ventilator Co., Chicago, Ill.
Paasche Airbrush Co., Chicago, Ill.
Peerless Electric Co., Warren, O.
Penn Ventilating Co., Philadelphia, Pa.
Phoenix Ventilator Co., Inc., Brooklyn, N. Y.
Propellair Div., Robbins & Myers Inc., Springfield, O.
Robertson Co., H. H., Pittsburgh, Pa.
Royal Ventilator Co., Philadelphia, Pa.
Somers, Inc., H. J., Detroit, Mich.
South Bend Air Products, Inc., South Bend, Ind.
Swartwout Co., The, Cleveland, O.
Trade-Wind Motorfans, Inc., Los Angeles, Calif.
Trane Co., The, La Crosse, Wis.
Tripar Products, Inc., Royal Oak, Mich.
Truflo Fan Co., Harmony, Pa.
Uno Ventilator Co., Malden, Mass.
Utility Appliance Corp., Los Angeles, Calif.
Van Noorden Co., E., Boston, Mass.
Washburne & Co., E. G., New York, N. Y.
Waverly Heating Supply Co., Boston, Mass.
WesternEngineering & Mfg. Co., Venice, Calif.
Wind-Way Fan & Ventilator Co., New Orleans, La.
Wing Mfg. Co., L. J., Linden, N. J.

VENTILATORS, ROOF, GRAVITY

Accurate Sheet Metal Mfg. Works, Chicago, Ill.
Air Control Products, Inc., Coopersville, Mich.
Air Devices, Inc., New York, N. Y.
Airjet Ventilator Co., Pasadena, Calif.
Ajax Furnace Fitting Co., Div. of Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Allen Ventilator Div., Production Planning Co., Rochester, Mich.
American-Larson Ventilation Co., Pittsburgh, Pa.
American Sheet Metal Works, New Orleans, La.
American Steel Band Co., Pittsburgh, Pa.
Ammerman Co., C. L., Minneapolis, Minn.
Arex Co., Chicago, Ill.
Bertram Co., Harvey P., The, Cincinnati, O.
Breidert Co., G. C., Los Angeles, Calif.
Brighton-Dickinson Div., Chicago, Ill.
Burt Mfg. Co., Akron, O.
Century Fan & Ventilator Co., Stamford, Conn.
Clay Equipment Corp., Cedar Falls, Ia.
Danzer Metal Works Co., Hagerstown, Md.
Empire Ventilation Equipment Co., Long Island City, N. Y.
Gehri Co., Tacoma, Wash.
Greenheck Bros. Mfg. Co., Schofield, Wis.
Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Inland Steel Products Co., Milwaukee, Wis.
Iona Ventilator Co., Inc., Philadelphia, Pa.
Iwan Brothers, South Bend, Ind.
Jordan & Co., Inc., Paul R., Indianapolis, Ind.
King Co., The, Owatonna, Minn.
Klauer Mfg. Co., Dubuque, Ia.
Kleenaire Corp., Stevens Point, Wis.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Lee & Son Co., Thomas, Cincinnati, O.
Levow, David, New York, N. Y.
Lumm Co., A. H., Toledo, O.
Lyon, Conklin & Co., Inc., Baltimore, Md.
Mellish & Murray Co., Chicago, Ill.
Moeschl-Edwards Corrugating Co., Inc., The, Cincinnati, O.
National Metal Fabricators, Chicago, Ill.
Newcomb-Detroit Co., Detroit, Mich.
Octagon Ventilator Co., Chicago, Ill.
Penn Ventilating Co., Philadelphia, Pa.
Phoenix Ventilator Co., Inc., Brooklyn, N. Y.
Pioneer Roofing & Sheet Metal Co., Muskogee, Okla.
Plasteel Products Co., Washington, Pa.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
Riggin Metal Products, Inc., Kankakee, Ill.
Robertson Co., H. H., Pittsburgh, Pa.
Royal Ventilator Co., Philadelphia, Pa.
St. Paul Corrugating Co., St. Paul, Minn.
Sioux Steel Co., Sioux Falls, S. D.
Souther Iron Co., E. E., St. Louis, Mo.
Standard Ventilator Co., Lewisburg, Pa.
Swartwout Co., The, Cleveland, O.
Tierney Rotor Ventilator Co., Minneapolis, Minn.
Tiffin Eaves Trough Co., Tiffin, O.
Uno Ventilator Co., Malden, Mass.
Van Noorden Co., E., Boston, Mass.
Walker Jamar Co., Duluth, Minn.
Warner Ventilator Co., La Grange, Ind.
Waverly Heating Supply Co., Boston, Mass.
Western Engineering & Mfg Co., Venice, Calif.
Willis Steel Corp., Galesburg, Ill.
York Corrugating Co., York, Pa.

VENTILATORS, UNIT

American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
American Blower Corp., Detroit, Mich.
Gannon Co., Russell R., Co., Inc., The, Cincinnati, O.
Nesbitt, Inc., John J., Philadelphia, Pa.
Norman Products Co., Inc., Columbus, O. (gas fired)
Trane Co., The, LaCrosse, Wis.
United States Air Conditioning Corp., Minneapolis, Minn.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

VIBRATION ISOLATORS

See Absorbers, Vibration; Bases and Pads, Vibration Isolating; Hose, Metal and Fittings

VISCOSIMETERS

American Instrument Co., Inc., Silver Spring, Md.
Brabender Corp., Rochelle Park, N. J.
Bristol Co., The, Waterbury, Conn.
Brookfield Engineering Laboratories, Inc., Stoughton, Mass.
Daigger & Co., A., Chicago, Ill.
Electric Sprayit Co., The, Sheboygan, Wis.
Fischer & Porter Co., Hatboro, Pa.
Fish-Schurman Corp., New Rochelle, N. Y.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Greiner Co., Emil, New York, N. Y.
Humboldt Mfg. Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Thomas Co., Arthur H., Philadelphia, Pa.
Ultra-Viscoson Corp., The, Hartford, Conn.
Will Corp., Rochester, N. Y.

VISES, PIPE

American Implement Co., Omaha, Neb.
American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Austin Corp., Robert, Boston, Mass.
Beaver Pipe Tools, Inc., Warren, O. (Sawing—for tubing)
Billings & Spencer Co., Hartford, Conn.
Capewell Mfg. Co., Hartford, Conn.
Crown Die & Tool Co., Chicago, Ill.
Desmond-Stephens Mfg. Co., Urbana, O.
Erie Tool Wks., Erie, Pa.
Hollands Mfg. Co., Erie, Pa.
Munton Mfg. Co., Franklin Park, Ill.
Nye Tool Co., Chicago, Ill.
Reed Mfg. Co., Erie, Pa.
Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Springload Mfg. Corp., Seattle, Wash.
Talon Tools, Inc., North Arlington, N. J.
Toledo Pipe Threading Machine Co., Toledo, O.
Vanderman Mfg. Co., Willimantic, Conn.
Williams & Co., J. H., Buffalo, N. Y.
Yost Mfg. Co., Meadville, Pa.

WASHERS, AIR

Air & Refrigeration Corp., New York, N. Y.
Altos Mfg. Co., Dallas, Tex.
American Blower Corp., Detroit, Mich.
Bahnson Co., Winston-Salem, N. C.
Bayley Blower Co., Milwaukee, Wis.
Bishop & Babcock Mfg. Co., Cleveland, O.
Blower Application Co., Milwaukee, Wis.
Buensod-Stacey, Inc., New York, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y.
Centri-Spray Corp., Detroit, Mich. (Wet type)
Clarage Fan Co., Kalamazoo, Mich.
Columbus Heating & Ventilating Co., Columbus, O
Comfort Products Corp., Dallas, Tex.
Continental Air Filters, Inc., Louisville, Ky.
Drying Systems, Inc., Chicago, Ill.
Ducon Co., The, Mineola, N. Y.
Economy Equipment Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Marlo Coil Co., St. Louis, Mo.
Mellish & Murray Co., Chicago, Ill.
Mountain States Equipment Co., Denver, Colo.
Parks-Cramer Co., Fitchburg, Mass.
Peters-Dalton, Inc., Detroit, Mich.
Phillips Cooling Tower Co., Inc., Brooklyn, N. Y.
Schmieg Industries, Detroit, Mich.
Silco Products, Inc., Minneapolis, Minn.
Spray Engineering Co., Somerville, Mass.
Strandwitz & Co., Inc., W. J., Camden, N. J.
Surface Combustion Corp., Toledo, O.
Tenney Engineering, Inc., Newark, N. J.
Trane Co., The, LaCrosse, Wis.
Utility Appliance Corp., Los Angeles, Calif.
Vilter Mfg. Co., Milwaukee, Wis.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
York Corp., York, Pa.

WASHERS, FUME

Aqua-Therm, Inc., Dayton, O.
Ducon Co., The, Mineola, N. Y.
Heil Process Equipment Corp., Cleveland, O.
Knight, Maurice A., Akron, Ohio

WATER CHILLERS

See Chillers, Water, for Air Conditioning and Refrigeration, Compressors, Refrigerating, Combined with Condenser, Water Chiller, Piping Connections, and Controls

WATER HAMMER ELIMINATORS

See Absorbers, Shock, Liquid

WATER RAMS FOR CLEANING OUT PIPE LINES

See Rams, Water

WATER TREATMENT

See Treatment, Water; Devices, Electrolytic, for Preventing Corrosion

WELD TESTING MACHINES

See Machines, Testing, Weld

WELDERS, ARC

Air Reduction Sales Co., New York, N. Y.
Allied Weld-Craft, Inc., Indianapolis, Ind.
Birdsell Mfg. Co., Inc., Palo Alto, Calif.
Borm Mfg. Co., Elgin, Ill.
Duro-Dyne Corp., Hempstead, L. I., N. Y.
Eisler Engineering Co., Inc., Newark, N. J.
Electric Arc, Inc., Newark, N. J.
Ergolyte Mfg. Co., Philadelphia, Pa.
Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
Fern, Ralph, Scranton, Pa.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Generator Sales Co., Chicago, Ill.
Hammett Electric Mfg. Co., Kansas City, Mo.
Hampton Electric Mfg. Co., Pittsburgh, Pa.
Harnischfeger Corp., Milwaukee, Wis.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
Hobart Bros. Co., Troy, O.
Kern Co., John A., Chicago, Ill.
Lee Co., K. O., Aberdeen, S. D.
Lincoln Electric Co., Cleveland, O.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y. (Inert gas-shielded)
Marquette Mfg. Co., Minneapolis, Minn.
Metal & Thermit Corp., New York, N. Y.
Mid-States Welder Mfg. Co., Chicago, Ill.
Miller Electric Mfg. Co., Inc., Appleton, Wis.
National Cylinder Gas Co., Chicago, Ill.
Niagara Machine & Tool Wks., Buffalo, N. Y.
Precision Welder Mfg. Co., Chicago, Ill.
Smith Corp., A. O., Milwaukee, Wis.
Smith Welding Equipment Corp., Minneapolis, Minn.
Trindl Products, Ltd., Chicago, Ill.
Tweco Products Co., Wichita, Kan. (Cable connectors, electrode holders and accessories)
U. S. Electric Welder Corp., Toledo, O.
Welding Apparatus Co., Chicago, Ill.
Westinghouse Electric Corp., Pittsburgh, Pa.
Will-Weld Mfg. Co., Inc., Omaha, Neb.

WELDERS, SPOT

Acme Electric Welder Co., Los Angeles, Calif
Acro Welder Mfg. Co., Milwaukee, Wis.
Agnew Electric Co., Milford, Mich.
Allied Weld-Craft, Inc., Indianapolis, Ind.
Alphil Spot Welding Co., Brooklyn, N. Y.
Birdsell Mfg. Co., Inc., Palo Alto, Calif.
DoAll Co., The, Des Plaines, Ill.
Duro-Dyne Corp., Hempstead, L. I., N. Y.
Eisler Engineering Co., Inc., Newark, N. J.
Electric Arc, Inc., Newark, N. J.
Federal Machine & Welder Co., The, Warren, O.
Fern, Ralph, Scranton, Pa.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y. (Inert gas-shielded arc)
Micro Products Co., Chicago, Ill.
Mid-States Welder Mfg. Co., Chicago, Ill.
Miller Electric Mfg. Co., Inc., Appleton, Wis.
National Cylinder Gas Co., Chicago, Ill.
Peer, Inc., Benton Harbor, Mich.
Rex Welder & Engineering Co., Kansas City, Mo.
Sciaky Bros., Inc., Chicago, Ill.
Taylor-Winfield Corp., Warren, O.
Thomson Electric Welder Co., Lynn, Mass.
Universal Power Corp., Cleveland, O.
Weldex, Inc., Detroit, Mich.

WELDERS, STUD

Nelson Stud Welding Div., Gregory Industries, Inc., Lorain, O.

WELDING AND CUTTING APPARATUS, OXY-ACETYLENE

Air Reduction Sales Co., New York, N. Y.
Allied Weld-Craft, Inc., Indianapolis, Ind.
All-State Welding Alloys Co., Inc., White Plains, N. Y. (welding positioner)
Arcos Corp., Philadelphia, Pa. (arc-oxygen)
Atlas Welding Accessories Co., Ferndale, Mich. (Weld cleaning tools)
Dockson Corp., Detroit, Mich.
Evans Machine Co., Inc., Baltimore, Md.
Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
Galv-Weld Products, Lima, O. (Regalvanizing process)
General Scientific Equipment Co., Philadelphia, Pa.
Goss Gas, Inc., Pittsburgh, Pa.
Harris Calorific Co., The, Cleveland, O.
Industrial Gas Div., The Liquid Carbonic Corp., Chicago, Ill.
Johnson Machine Works, Eau Claire, Wis. (rotary work aligner)
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Liquid Carbonic Corp., The, Chicago, Ill.
Marquette Mfg. Co., Minneapolis, Minn.
Modern Engineering Co., St. Louis, Mo.
National Cylinder Gas Co., Chicago, Ill.
Powder Weld Process Co., The, Brooklyn, N. Y.
Sight Feed Generator Co., West Alexandria, O. (portable and stationary acetylene generators)
Smith Welding Equipment Corp., Minneapolis, Minn.
Tru-Line Corp., Santa Monica, Calif. (Protractor for marking pipe)
Victor Equipment Co., Welding Equipment Div., San Francisco, Calif.
Worthington Corp., Dunellen, N. J. (Welding positioner)

WELDING FUME COLLECTORS

See Exhausters, Welding Fume

WELLS, THERMOMETER

Foxboro Co., Foxboro, Mass.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Philadelphia Thermometer Co., Philadelphia, Pa.
Trinity Equipment Corp., Roselle Park, N. J.

WHEELS, BLOWER

Advance Aluminum Castings Corp., Chicago, Ill.
Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
Barry Blower Co., Minneapolis, Minn.
Bayley Blower Co., Milwaukee, Wis.
Bishop & Babcock Mfg. Co., Cleveland, O.
Burden Div., Torrington Mfg. Co., Los Angeles, Calif
Carolina Blower Co., Inc., Greensboro, N. C.
Champion Blower & Forge Co., Lancaster Pa.
Clarage Fan Co., Kalamazoo, Mich.

General Blower Co., Morton Grove, Ill.
Hastings Air Conditioning Co., Hastings, Neb.
Jaden Mfg. Co., Hastings, Neb.
Jan-Air, Inc., Richmond, Ill.
Lau Blower Co., Dayton, O.
Martin Fan & Blower Co., Chicago, Ill.
Mayne Products Co., Dayton, O.
Morrison Products, Inc., Cleveland, O.
New York Blower Co., Chicago, Ill.
Palmer Mfg. Corp., Phoenix, Ariz.
Peerless Electric Co., Warren, O.
Revcor, Carpentersville, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.
Torrington Mfg. Co., The, Western Div., Van Nuys, Calif.
Torrington Mfg. Co., Torrington, Conn.
Triangle Mfg. Co., Oshkosh, Wis.
United States Air Conditioning Corp., Minneapolis, Minn.
Utility Appliance Corp., Los Angeles, Calif.
Utility Fan Corp., Div. of Utility Appliance Corp., Los Angeles, Calif.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

WINDOW PANELS FOR AIR CONDITIONERS

Russell Co., F. C., The, Cleveland, O.

WINDOWS, HEAT INSULATING

Anderson Corp., Bayport, Minn.
Chamberlin Co. of America, Detroit, Mich.
Ingersoll Products Div., Borg-Warner Corp., Chicago, Ill.
Kane Mfg. Corp., Kane, Pa.
Libbey-Owens-Ford Glass Co., Toledo, O.
Mississippi Glass Co., St. Louis, Mo.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Russell Co., F. C., The, Cleveland, O.

WIRE, ELECTRIC, NUMBERED, FOR CONTROL SYSTEMS

Chester Cable Corp., Chester, N. Y.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Midwest Automatic Control Co., Des Moines, Ia.
United States Rubber Co., New York, N. Y.

WIRE, INSTRUMENT

Chester Cable Corp., Chester, N. Y.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
United States Rubber Co., New York, N. Y.

WIRE, OIL BURNER IGNITION

Chester Cable Corp., Chester, N. Y.
United States Rubber Co., New York, N. Y.

WIRING, COMPLETE ASSEMBLIES, CUSTOM-MADE

Chester Cable Corp., Chester, N. Y.
Cornish-Rutland Co., Rutland, Vt.

WRENCHES, PIPE

American Machine Wks., Inc., Racine, Wis.
Ampco Metal, Inc., Milwaukee, Wis.
Armstrong Bros. Tool Co., Chicago, Ill.
Austin Corp., Robert, Boston, Mass.
Capewell Mfg., Hartford, Conn.
Billings & Spencer Co., Hartford, Conn.
Bonney Forge & Tool Works, Allentown, Pa.
Clark Bros. Mfg. Co., Hillsboro, Ore.
Erie Tool Works, Erie, Pa.
Fairmount Tool & Forging, Cleveland, O.
Faver, Inc., Salt Lake City, Utah
Frontier Bronze Corp., Niagara Falls, N. Y.
International Forge Co., Chicago, Ill.
Lowell Wrench Co., Worcester, Mass.
Lurie & Lurie, Chicago, Ill.
Nye Tool Co., Chicago, Ill.
Peck, Stow & Wilcox Co., Southington, Conn.
Ridge Tool Co., Elyria, O.
Roddick Tool Co., Anaheim, Calif.
Sac Tool Mfg Co., St. Louis, Mo.
Snap-on Tools Corp., Kenosha, Wis.
Talon Tools, Inc., North Arlington, N. J.
Trimont Mfg. Co., Div. of Aetna Industrial Corp., Boston, Mass.
Walworth Co., New York, N. Y.

WRENCHES, RATCHET

Armstrong Bros. Tool Co., Chicago, Ill.
Billings & Spencer Co., Hartford, Conn.
Blackhawk Mfg. Co., Milwaukee, Wis.
Bonney Forge & Tool Works, Allentown, Pa.
Duro Metal Products Co., Chicago, Ill.
Greene, Tweed & Co., North Wales, Pa.
J O Mfg. Co., South Gate, Calif.
Lowell Wrench Co., Worcester, Mass.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-on Tools Corp., Kenosha, Wis.
Tubing Appliance Co., Los Angeles, Calif.
William & Co., J. H., Buffalo, N. Y.

WRENCHES, TORQUE INDICATING

Ammco Tools, Inc., North Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Blackhawk Mfg. Co., Milwaukee, Wis.
Bonney Forge & Tool Works, Allentown, Pa.
Duro Metal Products Co., Chicago, Ill.
J O Mfg. Co., South Gate, Calif.
Richmont, Inc., Monrovia, Calif.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-on Tools Corp., Kenosha, Wis.
Sturtevant Co., P. A., Addison, Ill.
Williams & Co., J. H., Buffalo, N. Y.

X-RAY MACHINES AND FILM

See Machines and Film, X-Ray

ZONE CONTROLS

See Systems, Heating, Zone Control

NAMES AND ADDRESSES OF NATIONAL ENGINEERING SOCIETIES, ASSOCIATIONS, ETC.

Acoustical Society of America, 205 W. Monroe St., Chicago 6, Ill.

Air-Conditioning and Refrigeration Institute, 1346 Connecticut Ave., N. W., Washington 6, D. C.

Air Distribution Institute, 2130 Keith Bldg., Cleveland 14, Ohio

Air Filter Institute, 5200 Harvard Ave., Cleveland 5, Ohio

Air Pollution Control Association, 4400 Fifth Ave., Mellon Institute Bldg., Pittsburgh, Pa.

Aluminum Association, 420 Lexington Ave., New York 17, N. Y.

American Foundrymen's Association, 616 S. Michigan Ave., Chicago, Ill.

American Gas Association, 420 Lexington Ave., New York 17, N. Y.

American Industrial Hygiene Association, 4400 Fifth Ave., Pittsburgh 13, Pa.

American Institute of Architects, 1741 New York Ave., Washington, D. C.

American Institute of Electrical Engineers, 33 W. 39th St., New York 18, N. Y.

American Institute of Wholesale Plumbing & Heating Supply Associations, Inc., 402 Albee Bldg., Washington, D. C.

American Iron and Steel Institute, 350 Fifth Ave., New York 1, N. Y.

American Society for Testing Materials, 1916 Race St., Philadelphia, Pa.

American Society of Heating and Ventilating Engineers, 62 Worth St., New York 13, N. Y.

American Society of Heating and Ventilating Engineers Research Laboratory, 7218 Euclid Ave., Cleveland 3, Ohio

American Society of Mechanical Engineers, 29 W. 39th St., New York 18, N. Y.

American Society of Refrigerating Engineers, 40 W. 40th St., New York 18, N. Y.

American Standards Association, 70 E. 45th St., New York, N. Y.

American Uniform Boiler Law Society, 95 Liberty St., New York 6, N. Y.

American Welding Society, 33 W. 39th St., New York 18, N. Y.

Anthracite Institute, 101 Park Ave., New York 17, N. Y.

Anthracite Industries Laboratory, 237 Old River Rd., Wilkes Barre, Pa.

Bituminous Coal Institute, Southern Bldg., Washington 5, D. C.

Bituminous Coal Research, Inc., 2609 First National Bank Bldg., Pittsburgh 22, Pa.

Building Research Advisory Board, National Academy of Sciences, National Research Council, Washington 25, D. C.

Code for Pressure Piping, ASA Sectional Committee B31, L. W. Benoit, Secretary, 420 Lexington Ave., New York 17, N. Y.

Committee on Steel Pipe Research, American Iron and Steel Institute, 350 Fifth Ave., New York 1, N. Y.

Convector Manufacturers Association, Guardian Bldg., Detroit 26, Mich.

Cooling Tower Institute, 444 Emerson St., Palo Alto, Calif.

Copper and Brass Research Association, 420 Lexington Ave., New York 17, N. Y.

Cork Institute of America, 25 W. 43rd St., New York, N. Y.

Edison Electric Institute, 420 Lexington Ave., New York 17, N. Y.

Gas Appliance Manufacturers' Association, 60 E. 42nd St., New York 17, N. Y.

Heat Exchange Institute, 122 E. 42nd St., New York 17, N. Y.

Heating and Cooling Coil Manufacturers Association, 2159 Guardian Bldg., Detroit 26, Mich.

Heating, Piping and Air Conditioning Contractors National Association, Suite 1843, 30 Rockefeller Plaza, New York 20, N. Y.

Humidifier Association, 2300 Payne Ave., Cleveland 14, Ohio

Hydraulic Institute, 90 West St., New York, N. Y.

Independent Insulating Contractors National Association, Room 210, Shoreham Bldg., Washington 5, D. C.

Industrial Mineral Fiber Institute, 441 Lexington Ave., New York 17, N. Y.

Industrial Unit Heater Association, 2157 Guardian Bldg., Detroit 26, Mich.

Institute of Boiler and Radiator Manufacturers, 60 E. 42nd St., New York, N. Y.

Institute of Environmental Equipment Manufacturers, 30 Church St., New York, N. Y.

Institution of Heating and Ventilating Engineers, 49 Cadogan Sq., London, S.W. 1, England

Instrument Society of America, 921 Ridge Ave., Pittsburgh 12, Pa.

Insulation Board Institute, 111 W. Washington St., Chicago, Ill.

Magnesia Insulation Manufacturers Association, 1317 F St., N.W., Washington 4, D.C.

National Association of Building Owners and Managers, 134 S. LaSalle St., Chicago, Ill.

National Association of Corrosion Engineers, 1061 M & M Bldg., Houston 2, Texas

National Association of Fan Manufacturers, 2159 Guardian Bldg., Detroit 26, Mich.

National Association of Power Engineers, 176 W. Adams St., Chicago, Ill.

National Association of Practical Refrigerating Engineers, 435 N. Waller Ave., Chicago, Ill.

National Association of Vertical Turbine Pump Manufacturers, 301 W. Avenue 26, Los Angeles 31, Calif.

National Board of Fire Underwriters, 85 John St., New York, N. Y.

National Bureau of Standards, Washington 25, D. C.

National Certified Pipe Welding Bureau, Suite 1843, 30 Rockefeller Plaza, New York 20, N. Y.

National Coal Association, Southern Bldg., 15th and H Sts., N.W., Washington 5, D.C.

National District Heating Association, 827 N. Euclid Ave., Pittsburgh 6, Pa.

National Electrical Manufacturers Association, 155 E. 44th St., New York 17, N. Y.

National Fire Protection Association, 60 Batterymarch St., Boston, Mass.

National Heating Wholesalers Association, Suite 921, 228 N. LaSalle St., Chicago 1, Ill.

National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

National Steam Specialty Club, 666 Wabash Ave., Decatur, Ill.

National Warm Air Heating and Air Conditioning Association, 145 Public Square, Cleveland 14, Ohio

Oil-Heat Institute of America, 500 Fifth Ave., New York 36, N. Y.

Pipe Fabrication Institute, Clark Bldg., Pittsburgh 22, Pa.

Power Fan Manufacturers' Association, 2159 Guardian Bldg., Detroit 26, Mich.

Producers Council, 815 15th St., N. W., Washington, D. C.

Refrigeration and Air Conditioning Contractors Association, Inc., 228 N. LaSalle St., Chicago 1, Ill.

Refrigeration Equipment Wholesalers Association, 2607 N. High St., Columbus, Ohio

Refrigeration Industry Safety Advisory Committee, 155 E. 44th St., New York 17, N. Y.

Refrigeration Service Engineers Society, 433 N. Waller Ave., Chicago 44, Ill.

Refrigeration Trade Association of America, 3531 14th St., N.W., Washington 10, D.C.

Sheet Metal Contractors National Association, 170 Division St., Elgin, Ill.

Society of Automotive Engineers, 29 W. 39th St., New York, N. Y.

Society of the Plastics Industry, 67 W. 44th St., New York 36, N. Y.

Steam Heating Equipment Manufacturers Association, 1001 York St., Indianapolis 7, Ind.

Steel Boiler Institute, Land Title Bldg., Philadelphia 10, Pa.

Stoker Manufacturers Association, 307 N. Michigan Ave., Chicago 1, Ill.

Tubular Exchanger Manufacturers Association, 366 Madison Ave., New York, N. Y.

Underwriters' Laboratories, 207 E. Ohio St., Chicago, Ill.

DIRECTORY SECTION
HEATING, PIPING, AND AIR CONDITIONING EQUIPMENT FOR INDUSTRY AND LARGE BUILDINGS

PART 3—ALL TRADE NAMES

A-B—Motor controllers. Allen-Bradley Co., Milwaukee, Wis.

ABC—Humidifiers, dust collectors, unit coolers. American Blower Corp., Detroit, Mich.

A-C—Water treatment. Elgin Softener Corp., Elgin, Ill.

ACB—Coatings. Tropical Paint & Oil Co., Cleveland, O.

A/C Range—Filters. American Air Filter Co., Inc., Louisville, Ky.

A.P.S. Plasteel—Metal sheets. Plasteel Products Co., Washington, Pa.

A & R—Dehumidifiers. Air & Refrigeration Corp., New York, N. Y.

A.R.A.—Non-metallic sheets and board. Grant Wilson, Inc., Chicago, Ill.

ARRC—Couplings, fittings, flanges, unions. Union Metal Wks., Chelsea, Mass.

ASBO—Ventilators, louvers and shutters. American Steel Band Co., Pittsburgh, Pa.

ASME—Regulators. Bell & Gossett Co. Morton Grove, Ill.

Abrasoweld—Electrodes. Lincoln Electric Co., Cleveland, O.

Abso-Lute—Cement and compounds. Key Co., East St. Louis, Ill.

Accordion—Insulation. Infra Insulation, Inc., New York, N. Y.

Ace—Dampers. Martens & Stormoen, West Quincy, Mass.

Ace—Fittings, pipe, protective coatings, pumps, tanks, valves. American Hard Rubber Co., New York, N. Y.

Ace—Welders. Peer, Inc., Benton Harbor, Mich.

Ace-Parian—Fittings, pipe. American Hard Rubber Co., New York, N. Y.

Ace-Saran—Pipe, tubing. American Hard Rubber Co., New York, N. Y.

Acolite—Enamels and lacquers. Acorn Refining Co., Cleveland, O.

Acousteel—Insulation. Celotex Corp., The, Chicago, Ill.

Acousti-Celotex—Insulation. Celotex Corp., The, Chicago, Ill.

Acoustilite—Insulation. Insulite Co., Minneapolis, Minn.

Acratherm—Thermostats. Minneapolis-HoneyWell Regulator Co., Minneapolis, Minn.

Acro—Gages, regulators. Air Conversion Research Corp., Chicago, Ill.

Acrowrap—Insulation. Owens-Corning Fiberglas Corp., Toledo, O.

Acusti-Luminus—Panels. Luminous Ceilings, Inc., Chicago, Ill.

Actex—Heat exchangers. Wabash Mfg. Co., Chicago, Ill.

Adamant—Furnace cement. Botfield Refractories Co., Philadelphia, Pa.

Adastic—Insulating cement. Botfield Refractories Co., Philadelphia, Pa.

Adjust-O-Feeder—Feeders, pumps, water treatment. % Proportioneers, Inc. %, Providence, R. I.

Adjustor—Heating systems. The Kehm Corp., Chicago, Ill.

Adsco—Coils, regulators, coolers, exchangers, heaters, joints, meters, pipe hangers and supports, pipe protectors, separators, sight glasses, strainers, regulators. American District Steam Co., Inc., North Tonawanda, N. Y.

Adsco Dual—Traps. American District Steam Co., Inc., North Tonawanda, N. Y.

Adsco Rotary—Condensation meters. American District Steam Co., Inc., North Tonawanda, N. Y.

Aemco—Relays, switches. Automatic Electric Mfg. Co., Mankato, Minn.

Aeracool—Blades, fans, louvers and shutters. Myers Electric Co., Inc., Pittsburgh, Pa.

Aerisweld—Electrodes. Lincoln Electric Co., Cleveland, O.

Aero—Roof ventilators. Jordan & Co., Paul R., Indianapolis, Ind.

Aero—Aftercoolers, heat exchangers. Niagara Blower Co., New York, N. Y.

Aero—Radiation. National Radiator Co., The, Johnstown, Pa.

Aerodyne—Fans. Jeffrey Mfg. Co., Columbus, O.

Aerodyne—Collectors. Green Fuel Economizer Co., Beacon, N. Y.

Aerofuse—Air diffusers. Tuttle & Bailey, Inc., New Britain, Conn.

Aerolux—Air conditioning units. Johnson Co., S. T., Bridgeport, Pa.

Aeromaster—Propeller fans, blades. Koppers Co., Inc., Baltimore, Md.

Aeromatic Exhauster—Ventilators. Octagon Ventilator Co., Chicago, Ill.

Aeropass—Condensers. Niagara Blower Co., New York, N. Y.

Aeropel—Ventilators. American Blower Corp., Detroit, Mich.

Aeroplane—Roof ventilators. Jordan & Co., Paul R., Indianapolis, Ind.

Aeroplex—Fans. Bayley Blower Co., Milwaukee, Wis.

Aeropull—Roof ventilators. Jordan & Co., Paul R., Indianapolis, Ind.

Aero Seal—Packing. Chicago Belting Co., Chicago, Ill.

Aerospot—Fans. South Bend Air Products, Inc., South Bend, Ind.

Aerovane—Anemometers. Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.

Aerovane—Grilles, registers. Tuttle & Bailey, Inc., New Britain, Conn.

Aertite—Boiler & tank insulation. Johns-Manville, New York, N. Y.

Afco—Heaters. American Furnace Co., St. Louis, Mo.

Affco—Louvers and shutters. American Foundry & Furnace Co., Bloomington, Ill.

Agastat—Time switches, electrical relays. A'G'A Div. of Elastic Stop Nut Corp. of America, Elizabeth, N. J.

Agile—Welding electrodes. American Agile Corp., Bedford, O.

Agilene—Fittings, duct and duct fittings, pipe, tubing, valves. American Agile Corp., Bedford, O.

Agilide—Duct and duct fittings, pipe, valves. American Agile Corp., Bedford, O.

Agitair—Air diffusers, filters, heaters, meters. ventilators. Air Devices, Inc., New York, N. Y.

Airacoustic—Insulation. Johns-Manville, New York, N. Y.

Air Cell—Asbestos insulation. Keasbey & Mattison Co., Ambler, Pa.

Airco—Arc welders, welding rod, solder, pipe cutting machines, torches. Air Reduction Sales Co., New York, N. Y.

Air Control—Fans, heaters, unit air conditioners. Hastings Air Conditioning Co., Hastings, Neb.

Air-Con—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.

Airefiner—Water treatment. Oakite Products, Inc., New York, N. Y.

Airfuge—Separators. Swartwout Co., The, Cleveland, O.

Aire-Rectifier—Coolers. Lintern Corp., Painesville, O.

Airette—Roof ventilators. Penn Ventilator Co., Philadelphia, Pa.

Airex—Air washers, fans, unit air conditioners, ventilators. Mountain States Equipment Co., Denver, Colo.

Airflex—Couplings. Falk Corp., Milwaukee, Wis.

Air-flo—Louvers and shutters. Air Conditioning Products Co., Detroit, Mich.

Air Flow—Registers. The Louvra Corp., Union, N. J.

Airfoil—Fans, fan blades, ventilators. Aerovent Fan Co., Inc., Piqua, O.

Airfoil—Dampers, diffusers, grilles, registers. Titus Mfg. Corp., Waterloo, Ia.

Airgraph—Thermometers. Hausman Mfg. & Sales Co., Chicago, Ill.

Airguide—Hygrometers, indicators, thermometers. Fee and Stemwedel, Inc., Chicago, Ill.

Air Guide—Vanes. Titus Mfg. Corp., Waterloo, Ia.

Air Guide—Radiation. Rempe Co., Chicago, Ill.

Airid—Valves. Quality Specialty Co., Inc., Camden, N. J.

Airistocrat—Fan blades. Torrington Mfg. Co., Torrington, Conn.

Airjector—Ventilators. Swartwout Co., Cleveland, O.

Airlift—Ventilators. Swartwout Co., Cleveland, O.

Air Line—Motors. Brock-Brockmeyer Co., Inc., Dayton, O.

Airliner—Fan blades. Burden Co., Alan E., Los Angeles, Calif.

Airlouver—Louvers and shutters. Swartwout Co., The, Cleveland, O.

Airmaster—Dehumidifiers. Haertel Co., Walter, Minneapolis, Minn.

Airmat Arrester—Dust collectors. American Air Filter Co., Inc., Louisville, Ky.

Air-Max—Ventilators. Gallaher Co., The, Omaha, Neb. & Owatonna, Minn.

Air Meter—Air velocity meters. Hastings Instrument Co., Inc., Hampton, Va.

Airmover—Ventilators. Swartwout Co., The, Cleveland, O.

Airocool—Air conditioning units. Mefco Mfg. Co., Air Cond. Div., Glendale, Calif.

Airocool—Burners. National Airoil Burner Co., Inc., Philadelphia, Pa.

Airo-Flex—Registers. Auer Register Co., Cleveland, O.

Airoflo—Ventilators. Mefco Mfg. Co., Air Conditioning Div., Glendale, Calif.

Airfoil—Registers, scoops, grilles, dampers, diffusers. Titus Mfg. Corp., Waterloo, Ia.

Airoil—Oil burners. National Airoil Burner Co., Inc., Philadelphia, Pa.

Air-O-Line—Pumps, valves. Beckett & Co., Inc., Thomas, Dallas, Tex.

Air-O-Matic—Air conditioning units. Williams Div., Eureka Williams Corp., Bloomington, Ill.

Airotor—Blower wheels. Torrington Mfg. Co., Torrington, Conn.

Airout—Ventilators. Western Engineering & Mfg. Co., Venice, Calif.

Air-O-Vane—Diffusers. Krueger Air Conditioning Co., Tucson, Ariz.

Airovent—Gas Burners. National Airoil Burner Co., Inc., Philadelphia, Pa.

Airpak—Filters. Conoflow Corp., Philadelphia, Pa.

Air Rad—Radiation. Penn Boiler & Burner Corp., Lancaster, Pa.

Airsan—Filters. Air Filter Corp., Milwaukee, Wis.

Air-Scoop—Eliminators. Taco Heaters, Inc. Providence, R. I.

Airstat — Regulators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Airswitch—Thermostats, regulators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Airtrol—Air eliminators. Bell & Gossett Co., Morton Grove, Ill.

Airtron—Ducts and duct fittings, hose, insulation. Arrowhead Rubber Co., Long Beach, Calif.

Air-Tumbler—Dust collectors. Dust Suppression & Engineering Co., Lake Orion, Mich.

Airturn—Duct turning vanes. Barber-Colman Co., Rockford, Ill.

Airvalve—Ventilators. Swartwout Co., Cleveland, O.

Air-Van—Ventilators, exhausters, fans. The Gallaher Co., Owatonna, Minn., Omaha, Neb.

Air-Wave—Fans. Trade-Wind Motorfans, Inc., Los Angeles, Calif.

Airxpel—Traps. Wright-Austin Co., Detroit, Mich.

Airxpeler—Roof ventilators, dampers, exhausters, centrifugal fans, louvers and shutters, vent flue caps. Ammerman Co., G. L., Minneapolis, Minn.

Ajax—Gaskets, United States Gasket Co., Camden, N. J.

Akon—Water treatment. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Aktiv—Cleaning compounds. Turco Products, Inc., Los Angeles, Calif.

Alcalex—Water softeners. Research Products Corp., Madison, Wis.

Alco—Ventilators. Lumm Co., A. H., Toledo, O.

Alcoa—Angles, compounds, rods, dehydrators, electrodes, exchangers, pipe, sheets, tanks, tubing. Aluminum Co. of America, Pittsburgh, Pa.

Alcuplate—Clad sheets. General Plate Div., Metals & Controls Corp., Attleboro, Mass.

Alen—Units, washers. Comfort Products Corp., Dallas, Tex.

Alfer—Clad sheets. General Plate Div., Metal & Controls Corp., Attleboro, Mass.

Alfol—Insulation. Reflectal Corp., New York, N. Y.

Algaecide—Water treatment. Western Chemical Co., Kansas City, Mo.

Allencote—Refractories and refractory cement. Allen Co., Robert G., Mechanicsville, N. Y.

Allenite—Soot destroyers. Allen Co., Robert

G., Mechanicsville, N. Y.
All-Flex—Pipe joints, hose, packing. Gil-Lair Products, Inc., Pasadena, Calif.
All-In-One—Regulators. Bell & Gossett Co., Morton Grove, Ill.
All-Metl—Vibration isolating bases and pads. Barry Corp., Watertown, Mass.
All Purpose—Grilles. Louvra Corp., The, Union, N. J.
Allspeed Selector—Mechanical changers. Worthington Corp., Harrison, N. J.
All-Tite—Vanes. Elgen Mfg. Corp., Long Island City, N. Y.
Alnifer—Clad sheets. General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Alnor—Anemometers, indicator controllers, thermometers. Illinois Testing Laboratories, Inc., Chicago, Ill.
Alodine—Protective coatings. American Chemical Paint Co., Ambler, Pa.
Aloyco—Pipe, tubing, valves. Alloy Steel Products Co., Linden, N. J.
Alpine—Air conditioning units. International Metal Products Co., Phoenix, Ariz.
Allprene—Gaskets. Chicago Gasket Co., Chicago, Ill.
Alsiplate—Clad sheets. General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Alternarc—Arc welders. Electric Arc, Inc., Newark, N. J.
Alumaweld—Solder and fluxes. Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Aluminweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Alumiseal—Insulation. Hogan & Co., Inc., C. T., New York, N. Y.
A-Lum-O—Filters. Bard Mfg. Co., Bryan, O.
A-Lum-O-Aire—Filters. Carey Electronic Engineering Co., Metal Wool Div., Springfield, O.
Alundum—Grinders and grinding wheels. Norton Co., Worcester, Mass.
Always Reliable—Benders, cutters, torches, wrenches. Bernz Co., Otto, Rochester, N. Y.
Amblerex—Insulating cement. Keasbey & Mattison Co., Ambler, Pa.
Amco—Protective coatings. American Solder & Flux Co., Philadelphia, Pa.
Amco—Humidifiers. Grinnell Co., Inc., Providence, R. I.
Amco—Control Systems, humidifiers, hygrometers, indicators, meters, nozzles, tanks, air conditioning units, psychrometers, valves. American Moistening Co., Providence, R. I.
Amcoil—Radiation, cooling and heating surfaces. American Coils Co., Newark, N. J.
Amer-glas—Air filters. Beck Mfg. Co., New Albany, Ind.
Amer-glas—Unit filters. American Air Filter Co., Inc., Louisville, Ky.
American—Absorbers, metal hose, tubing. American Metal Hose Branch, American Brass Co., The, Waterbury, Conn.
American—Couplings. American Flexible Coupling Co., Erie, Pa.
American—Furnaces, heaters. American Foundry & Furnace Co., Bloomington, Ill.
American—Recorders, hygrometers, indicator-controllers, manometers, regulators, valves, thermometers, transmitters, wells. Manning, Maxwell & Moore, Inc., Stratford, Conn.
American—Meters. American Meter Co., Inc., Philadelphia, Pa.
American—Speed reducers. American Pulley Co., Philadelphia, Pa.
American—Pumps, softeners, water filters, water treatment. American Well Works, Aurora, Ill.
American—Pipe benders. American Pipe Bending Machine Co., Inc., Poultney, Vt.
American—Radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
American—Meters. Buffalo Meter Co., Buffalo, N. Y.
American Empire—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
American Exbrook—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
American Hammered—Rings. Koppers Co., Inc., Metal Products Div., Baltimore, Md.
American H/V—Unit Filters. American Air Filter Co., Inc., Louisville, Ky.
American Redflash-Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
American Standard—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
American Superfin—Heaters. American Foundry & Furnace Co., Bloomington, Ill.
American Water Tube—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Amerigear—Couplings. American Flexible Coupling Co., Erie, Pa.
Ameritherm—Heaters, air conditioning units. American Thermal Industries, Inc., Detroit, Mich.
Amerjet—Collectors. American Air Filter Co., Inc., Louisville, Ky.
Ames—Pumps. Domestic Pump & Mfg. Corp., Shippensburg, Pa.
Amesteam—Boilers. Ames Iron Works, Inc., Oswego, N. Y.
Aminco—Colorimeters, gage testers, Indicator-controllers, indicators, pumps, recorders, regulators, relays, viscosimeters. American Instrument Co., Inc., Silver Spring, Md.
Ammonoduct—Pipe. Bethlehem Steel Co., Bethlehem, Pa.
Am-Pe-Co—Centrifugal fans. American Machine Products Co., Marshalltown, Ia.
Amtico—Heaters, air conditioning units. American Thermal Industries, Inc., Detroit, Mich.
Anaconda—Fittings, pipe, welding rod, sheets, solder, tubing, valves. American Brass Co., Waterbury, Conn.
Anemotherm—Direct reading meters, Anemostat Corp. of America, New York, N. Y.
Ankorite—Packing. Anchor Packing Co., Philadelphia, Pa.
Anthracite 1600—Water heaters. Catskill Metal Works, Inc., Catskill, N. Y.
Anti-Spatter—Welding compounds. Wolfe-Kote Co., Inc., Sheboygan, Wis.
Apco—Turbine type pumps, systems. Aurora Pump Co., Aurora, Ill.
Apeco—Blueprint machines. American Photocopy Equipment Co., Chicago, Ill.
Apex—Analyzers, recorders, indicators. Uehling Instrument Co., Paterson, N. J.
Apexior—Coatings. Dampney Co., The, Boston, Mass.
Apsco—Switches. April Showers Co., Inc., Washington, D. C.
Aptco—Wrenches. Faver, Inc., Salt Lake City, Utah
Apthorp—Nozzles. Boston Machine Works, Inc., Lynn, Mass.
Aqua-Clear—Water treatment. Sudbury Laboratory, South Sudbury, Mass.
AquaHeater—Heaters. Lewis & Co., Joseph E., Baltimore, Md.
Aqualator—Circulators. Triplex Heating Specialty Co., Inc., Peru, Ind.
Aqua-Matic—Heaters. Heat Equipment, Not Inc., Chicago, Ill.
Aquamizer—Condensers. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Aquanite—Enamels & lacquers. Atlas Powder Co., Industrial Finishes Dept., North Chicago, Ill.
Aquastat—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Aqua-Tite—Seals. Schwitzer-Cummins Co., Indianapolis, Ind.
Aquatone—Treatment, steam and water. Ampion Corp., Long Island City, N. Y.
Aquatower—Cooling towers. Marley Co., Inc., The, Kansas City, Mo.
Aqulux—Heaters. Johnson Co., S. T., Bridgeport, Pa.
Arbest—Flanges, hangers, humidifiers, nipples, plates, valves. G & H Mfg. Co., Philadelphia, Pa.
Arc-Eng—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Arco—Packing. Chicago Belting Co., Chicago, Ill.
Arco—Hangers, radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Arcoliner—Boilers. American Radiator & Standard Sanitary Corp. Pittsburgh, Pa.
Arco Sil—Hose. Arrowhead Rubber Co., Long Beach, Calif.
Arctic Circle—Air conditioning units. International Metal Products Co., Phoenix, Ariz.
Arex-Austor—Roof ventilators. Arex Co., Chicago, Ill.
Arid Air—Dehumidifiers. Tamms Industries, Inc., Chicago, Ill.
Arin—Louvers and shutters. Arex Co., Chicago, Ill.
Armaloy—Wrenches. Armstrong Bros. Tool Co., Chicago, Ill.
Armorak—Insulation. Keasbey Co., Robert A., New York, N. Y.
Armstrong-Bridgeport—Benders, chasers, cutters, pipe cutting oil, reamers, stands, stocks and dies, taps, tools, vises, and wrenches. Capewell Mfg. Co., Hartford, Conn.
Arrow-Line—Heaters. Bastian-Morley Co., Inc., La Porte, Ind.
Arrowtrol—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Art—Direct radiation. The National Radiator Co., Johnstown, Pa.
Artcraft—Air heaters. Chicago Steel Furnace Co., Chicago, Ill.
Artic—Refrigerant. E. I. du Pont de Nemours & Co., Wilmington, Del.
Asbestocel—Boiler, tank & pipe insulation. Johns-Manville, New York, N. Y.
Asbestocite—Boiler & tank insulation. Johns-Manville, New York, N. Y.
Asco—Valves, relays, switches, panel and control boards. Automatic Switch Co., Orange, N. J.
Ashcroft—Gages, cocks, recorders, testers, transmitters. Manning, Maxwell & Moore, Inc., Stratford, Conn.
At-a-Glance—Gages. Krueger Sentry Gauge Co., Green Bay, Wis.
Atlas—Fans, furnaces, heaters. International Sales Co., San Francisco, Calif.
Atomick—Humidifiers, nozzles. Maid-O'-Mist, Inc., Chicago, Ill.
Atomist—Humidifiers. American Foundry & Furnace Co., Bloomington, Ill.
AutofyrStop—Systems. Merchant & Evans Co., Philadelphia, Pa.
Autographs—Nameplate parts. Metalcraft Inc., Mason City, Ia.
Auto-Klean—Filters, strainers. Cuno Engineering Corp., Meriden, Conn.
Autolite—Motors, wire, recorders, thermometers. Electric Autolite Co., Instrument & Gauge Div., Toledo, O.
Autolube—Bearings. International Powder Metallurgy, Inc., Ridgway, Pa.
Automaze—Filters. Air-Maze Corp., Cleveland, O.
Autovent—Eliminators, humidifiers, valves. Maid-O'-Mist, Inc., Chicago, Ill.
Autronic—Recorders, indicator-controllers, meters, recorder-controllers. Swartwout Co., The, Cleveland, Ohio.
Axivane—Blowers. Joy Mfg. Co., Pittsburgh.

B.A.C.—Condensers, oil coolers, cooling towers. Baltimore Aircoil Co., Inc., Baltimore, Md.
B. B.—Blast gates. Berger Bros. Co., Philadelphia, Pa.
B & B—Heating and air conditioning equipment. Bishop & Babcock Mfg. Co., Cleveland, O.
B & C—Plates, valves, unions. Beaton & Corbin Mfg. Co., Southington, Conn.
BCA—Bearings. Bearings Co. of America, Lancaster, Pa.
B. & G.—Air eliminators, circulators, coolers, condensers, fittings, heat exchangers, heaters, heating systems, temperature regulators, tanks, valves. Bell & Gossett Co., Morton Grove, Ill.
B-H—Insulation. Baldwin-Hill Co., Trenton, N. J.
B-H—Insulating cement, pipe insulation. Baldwin-Hill Co., Trenton. N. J.
B-H No. 1 Powerhouse—Insulation. Baldwin-Hill Co., Trenton, N. J.
B & J—Orifices, strainers, systems, traps, valves. Barnes & Jones, Inc., Boston, Mass.
B & K—Pipe cutting and threading machines. Bignall & Keeler, Div., John Ramming Machine Co., St. Louis, Mo.
B-Line—Electric motors. Brown-Brockmeyer Co., Inc., Dayton, O.
B.O.—Cocks, joints, valves. Bordo Co., Inc., L. J., Glenside, Pa.
B & P Enamel—Enamels and lacquers. Tropical Paint & Oil Co., Cleveland, O.
B & W—Boilers, burners, desuperheaters, fuel economizers, refractories, stokers, superheaters. Babcock & Wilcox Co., New York, N. Y.
B & W—Pipes, tubes, and tubing. Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
B & W—Tubing. Babcock & Wilcox Co., The, Tubular Products Div., Alliance, O.
Bacite—Insulation. Bird-Archer Co., Philadelphia, Pa.
Baco—Soot destroyer, pumps. Bird-Archer Co., Philadelphia, Pa.
Badger—Time switches. Reliance Automatic Lighting Co., Racine, Wis.
Baflex—Enamels and lacquers, protective coatings. Interchemical Corp., Finishes Div., Newark, N. J.
Balance-trol—Heating systems. Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Baldwin-Rex—Couplings, chain drives. Chain Belt Co., Milwaukee, Wis.
Ball Bushings—Ball bearings. Thomson Industries, Inc., Manhasset, N. Y.
Ball-Rite—Drills. Cummins Portable Tool Co., Chicago, Ill.
Balsam-Wool—Insulation. Wood Conversion Co., St. Paul, Minn.
Bankheat—Oil burners. Johnson Co., S. T., Bridgeport, Pa.
Banroc—Pipe insulation. Johns-Manville, New York, N. Y.
Bantam—Pumps. Gelber Co., Samuel S., Chicago, Ill.
Barcol—Humidistats, motors, operators, regulators, thermostats, valves. Barber-Colman Co., Rockford, Ill.
Barnes—Cutters. Erie Tool Works, Erie, Pa.
Barreled Sunlight—Enamels. U.S. Gutta Percha Paint Co., Providence, R. I.
Barry—Bearings, pulleys and sheaves. Dick Co., Inc., R. & J., Passaic, N. J.
Barton-American—Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.
Base Ray—Baseboard radiation. Burnham Corp., Boiler Div., Irvington, N. Y.
Basifrit—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
Bay State—Enamels and lacquers. Devoe & Raynolds Co., Inc., New York, N. Y.
Bazooka—Torches. Industrial Engineered Products Co., Los Angeles, Calif.
Beacor—Valves. Beaton & Corbin Mfg. Co., Southington, Conn.

Beaverkill—Leather belting and v-belts. Baldwin Belting, Inc., New York, N. Y.
Beco-Cell—Corrosion treatment, scale removal. Brown Electro Co., Oklahoma City, Okla.
Belco—Fans, louvers and shutters. Belter Electric Mfg. Co., G. J., The, St. Louis, Mo.
Bell-Pack—Clamps. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Beloit—Machines, punches, power shears. Hendley & Whittemore Co., Beloit, Wis.
Berkshire—Hangers and supports. Armart Mfg. Co., Pittsfield, Mass.
Bermico—Fiber glass. Brown Co., Boston, Mass.
Bestfelt—Insulation. Keasbey & Mattison Co., Ambler, Pa.
Beth-Co-Weld—Pipe. Bethlehem Steel Co., Bethlehem, Pa.
Beth-Cu-Loy—Sheets. Bethlehem Steel Co., Bethlehem, Pa.
Bi-Air—Burners. John Zink Co., Tulsa.
Bifurcator—Fans. DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Bildrite—Insulation. Insulite Co., Minneapolis, Minn.
Biltin—Heaters. Taco Heaters, Inc., Providence, R. I.
Bi-Mix—Burners. John Zink Co., Tulsa, Okla.
Binoc—Thermometers. Taylor Instrument Companies, Rochester, N. Y.
Bison—Boilers. Farrar & Trefts, Buffalo, N. Y.
Bitumastic—Protective coatings. Koppers Co., Inc., Pittsburgh, Pa.
Bituminous—Bases and pads. Celotex Corp., The, Chicago, Ill.
Bituminous—Coatings. Robertson Co., H. H., Pittsburgh, Pa.
Bituplastic—Coatings. Koppers Co., Inc., Pittsburgh, Pa.
Black Baking Japans—Enamels and lacquers. Hilo Varnish Co., Brooklyn, N. Y.
Black Magic—Cement and compounds. Bowser, Inc., Fort Wayne, Ind.
Blazecrete—Refractories. Johns-Manville, New York, N. Y.
Bloapco—Dust collectors. Blower Application Co., Milwaukee, Wis.
Blo-Cold—Unit coolers. Acme Industries, Inc., Jackson, Mich.
Bloflex—Hose. Flexaust Co., New York, N. Y.
Blu-Cold—Compressors. Lehigh Mfg. Co., Div. of Lehigh Foundries, Inc., Lancaster, Pa.
Blue Circle—Heating boilers. Dunkirk Radiator Corp., Dunkirk, N. Y.
Blueknight—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Blue-Point—Cutters, Tools, wrenches. Snap-on Tools Corp., Kenosha, Wis.
Blue Ribbon—Headers and nipples. Chicago Nipple Mfg. Co., Cicero, Ill.
Blue Streak—Dehydrators. Wabash Mfg. Co., Chicago, Ill.
Boardman—Pump governors. Locke Regulator Co., Salem, Mass.
Bob—Float valves. Robert Mfg. Co., Los Angeles, Calif.
Boilergard—Low water cut-offs. Maid-O'-Mist, Inc., Chicago, Ill.
Boiler-Lox—Compounds. Radiator Specialty Co., Charlotte, N. C.
Boiler Solder Seal—Compounds. Radiator Specialty Co., Charlotte, N. Carolina.
Bondwich—Clad sheets. General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Borgana—Compounds, treatments. Strong, Carlisle & Hammond Co., Cleveland, O.
Bosco—Clay pipe. Bowerston Shale Co., The, Bowerston, O.
Boston-Standard—Draft controls. Boston Machine Works Co., Lynn, Mass.
Brad-Ray—Radiant heating coils and panels. Carlon Products Corp., Cleveland, O.
Branford—Oil burners, unions. Malleable Iron Fittings Co., Branford, Conn.
Brassweld—Compounds. Sight Feed Generator Co., West Alexandria, O.
Brazaloy—Solder. All-State Welding Alloys Co., Inc., White Plains, N. Y.
Brazo—Solder. Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Breeze Master—Fans. Acme Equipment Co., Muskogee, Okla.
Breezo—Fans. Buffalo Forge Co., Buffalo, N. Y.
Breezy-Air—Air conditioning units. Barwick Mfg. Corp., Wichita, Kan.
Brillant Fire—Dehumidifiers. Ohio Foundry & Mfg. Co., Steubenvile, O.
Bronco—Clad sheets. General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Bronzende—Electrodes. Arcos Corp., Philadelphia, Pa.
Bronzeweld—Compounds. Sight Feed Generator Co., West Alexandria, O.
Brooklyn—Adhesive tape. Johns-Manville, New York, N. Y.
Brown-Heet—Heaters. Brown Products Co., Forest Hills, N. Y.
Brule—Incinerators. Goder Incinerator Corp., Chicago, Ill.
BTUnit—Unit heaters. Industrial Mfg. & Engineering Co., Chicago, Ill.
Budget—Water heaters. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Buildrite—Insulation. Insulite Div., Minnesota and Ontario Paper Co., Minneapolis.
Bulator—Grilles. Hendrick Mfg. Co., Carbondale, Pa.
Bulldog—Bolts. Polis Mfg. Co., J. D., Chicago, Ill.
Bulldog—Shears and snips. Wiss & Sons Co., J., Newark, N. J.
Bull Dog—Stocks and dies. Oster Mfg. Co., Cleveland, O.
Bull Dog—Pipe and tubing. Phelps Dodge Copper Products, British American Tube Div., New York, N. Y.
Bull Dog—Valves. The Carpenter Mfg. Corp., Cleveland, O.
Bull's Eye—Glasses. Fischer & Porter Co., Hatboro, Pa.
Bullet—Filters. Sealed Unit Parts Co., Inc., Bronx, N. Y.
Bundyflex—Steel tubing. Everhot Products Co., Chicago, Ill.
Bundyweld—Tubes and tubing. Bundy Tubing Co., Detroit, Mich.
Bunker Hill—Fittings, pipe, sheets, solder. Northwest Lead Co., Seattle, Wash.
Burks—Pumps. Decatur Pump Co., Decatur, Ill.
Burnham—Compressors, condensers, pumps. Union Steam Pump Co., Battle Creek, Mich.

CC—Treatment. Utility Laboratory, Inc., Brooklyn, N. Y.
C-E—Boilers, burners, stokers, fuel economizers. Combustion Engineering, Inc., New York, N. Y.
C F B Super—Cement. Chicago Fire Brick Co., Chicago, Ill.
C-H—Alarms, controllers and starters, heaters, relays, regulators, switches, valves. Cutler-Hammer, Inc., Milwaukee, Wis.
CM—Hoists. Chisholm-Moore Hoist Div., Columbus McKinnon Chain Corp., Tonawanda, N. Y.
C & M—Hangers or brackets, inserts. Carty & Moore Engineering Co., Detroit, Mich.
COM—Blowers. Wing Mfg. Co., L. J., New York, N. Y.
C & R—Regulators. Automatic Control Co., St. Paul, Minn.
CSP—Transformers. Westinghouse Electric Corp., Pittsburgh, Pa.
CW—Pipe. Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
CWF—Chillers. Taco Heaters, Inc., Providence, R. I.
Cadillac-Meters. Central Station Steam Co., Detroit, Mich.
Cadman—Valves. Barrett Machine Co., Pittsburgh, Pa.
Cadwell—Pressure regulators, valves. Beaton & Cadwell Mfg. Co., New Britain, Conn.
Calco—Valves. California Brass Mfg. Co., Los Angeles Calif.
Calktite—Cement and compounds. U. S. Stoneware Co., New York, N. Y.
Calorex—Oil burners. W. N. Best Combustion Equipment Co., Inc., Carlstadt, N. J.
Camomatic—Valves. Belco Industrial Equipment Div., Inc., Paterson, N. J.
Campbell—Regulators, controls. Fuel Reduction Corp., Chicago, Ill.
Capacilogs—Temperature recorders. Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.
Capacitrols—Indicator-controllers. Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.
Capillary—Air washers. Clarage Fan Co., Kalamazoo, Mich.
Capillary—Air washers, humidifiers, cooling towers, unit air conditioners. Air & Refrigeration Corp., New York, N. Y.
Capitol—Boilers, hanger or brackets, heaters, radiation. United States Radiator Corp., Detroit, Mich.
CaPlugs—Fittings. Protective Closures Co., Inc., Buffalo, N. Y.
Carbolite—Soot destroyers. Ampion Corp., Long Island City, N. Y.
Carbozite—Coatings. Ohmlac Paint & Refining Co., Long Island City, N. Y.
Careyduct—Ducts and duct fittings, insulation, non-metallic sheets, duct turning vanes. Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Cash-Acme—Heating systems, pipe strainers, regulators, valves. Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Cassell—Templates. Graphic Indicator Co., Los Angeles, Calif.
Castalu—Fans, wheels. Advance Aluminum Castings Corp., Chicago, Ill.
Cast-Refract—Refractories. Quigley Co., Inc., New York, N. Y.
Catch-All—Dehydrators. Sporlan Valve Co., St. Louis, Mo.
Cat's Eye—Observation ports. Ess Instrument Co., Bergenfield, N. J.
Causul—Valves. Lunkenheimer Co., Cincinnati, O.
Celeritas—Colorimeters. Daigger & Co., A., Chicago, Ill.
Cell-U-Blanket—Insulation. Masonite Corp., Chicago, Ill.
Cellufoam—Insulation. Masonite Corp., Chicago, Ill.
Celoron—Couplings. Continental-Diamond Fibre Co., Newark, Del.
Celo-Siding—Insulation. Celotex Corp., The, Chicago, Ill.
Cemcoat—Enamels and lacquers. Sonneborn Sons, Inc., New York, N. Y.
Cementseal—Enamels and lacquers. Acorn Refining Co., Cleveland, O.
Cemesto—Insulation. Celotex Corp., The, Chicago, Ill.
Central Aire—Unit air conditioners. Bakeraire Corp., South Windham, Me.
Central—Conduit. Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
CenTraVac—Compressors. Trane Co., The, La Crosse, Wis.
Centrimax—Meters. Leeds & Northrup Co., Philadelphia, Pa.
Centripac—Packing. Johns-Manville, New York, N. Y.
Centripeller—Roof ventilators. Jordan & Co., Paul R., Indianapolis, Ind.
Centrispray—Air Washers. Bahnson Co., Winston-Salem, N. C.
Century—Pipe. Keasbey & Mattison Co., Ambler, Pa.
Certified Climate—Air conditioning units, washers. Parks-Cramer Co., Fitchburg, Mass.
Cesco—Fittings. Columbia Engineering Service Co., Santa Rosa, Calif.
Chaco—Boiler and radiator sealing compounds. Desolvo Co., The, Pittsburgh, Pa.
Challenger—Propeller fans. Signal Electric Mfg. Co., Menominee, Mich.
Champion—Furnaces, heaters. National Heater Co., St. Paul, Minn.
Champion—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Champion—Pumps. Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Chan-L-Mounts—Bases and pads. Lord Mfg. Co., Erie, Pa.
Charg-A-Can—Refrigerants. Eston Chemicals, Div. American Potash & Chemical Corp., Los Angeles, Calif.
Chemical—Gaskets, joints, packing, couplings. United States Gasket Co., Camden, N. J.
Chem-o-Feeder—Feeders, pumps, water treatment. % Proportioneers, Inc., % Providence, R. I.
Chem-O-Shot—Pumps. %Proportioneers, Inc.%, Providence, R. I.
Chempac—Gaskets, packing. Johns-Manville, New York, N. Y.
Chenco—Compounds, water treatment, softeners. Chemical Engineering Co., Dallas, Tex.
Chevron—Packing. Garlock Packing Co., Palmyra, N. Y.
Chicago—Brakes. Dreis & Krump Mfg. Co., Chicago, Ill.
Chicago—Drills. Chicago Expansion Bolt Co.. Chicago, Ill.
Chicago—Stokers. Eddy Stoker Corp., Chicago, Ill.
Chicago-Wrigley—Bolts. Chicago Expansion Bolt Co., Chicago, Ill.
Chico Brikset—Cement. Chicago Fire Brick Co., Chicago, Ill.
Chief Thred-O-Matic—Pipe cutting machines. Gaines-Collins, Quijada Tool Division, Los Angeles, Calif.
Chill Air—Air conditioning units, fans. National Engineering & Mfg. Co., Sedalia, Mo.
Chill Vactor—Chillers and steam jet compressors. Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Chimney Sweep—Chemical destroyers. Coughlan Co., G. N., West Orange, N. J.
Chinook—Ferrous heating surface. Bayley Blower Co., Milwaukee, Wis.
Chlorimet—Heat exchangers, fans, fittings, heaters, pipe, pumps, sheets, valves. Duriron Co., Inc., The, Dayton, O.
Chlor-O-Mite—Pumps. %Proportioneers, Inc.,% Providence, R. I.
Chore Boy—Burners. Standard Fuel Engineering Co., Detroit, Mich.
Chromalox—Preheaters, indicators-controllers, heating systems, superheaters, thermostats, unit heaters. Wiegand Co., Edwin L., Pittsburgh, Pa.
Chrome Lock—Gaskets, tape. Products Research Co., Los Angeles, Calif.
Chromend—Electrodes. Arcos Corp., Philadelphia, Pa.
Chromix—Refractories. Quigley Co., Inc., New York, N. Y.
Chronoflo—Flow meters, recorders. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Chronometer—Valves. Defender Instrument & Regulator Co., St. Louis, Mo.
Chronotherm—Thermostats. Minneapolis-

Honeywell Regulator Co., Minneapolis

Chil-Lator—Coolers. McQuay, Inc., Minneapolis, Minn.

Cinch—Expansion bolts. National Lead Co. New York, N. Y.

Circle-Air—Convection radiation. Paley Mfg. Corp., Brooklyn, N. Y.

Circle T—Switches. Trumbull Dept., General Electric Co., Plainville, Conn.

Circo—Louvers and shutters, fan housings. Circulators & Devices Mfg. Co., Brooklyn.

Clair-Tex—Connections. St. Clair Rubber Co., Detroit, Mich.

Clamp-A-Leak—Pipe repair clamps. Chelsea Metal Stamping Co., New York, N. Y.

Clarco—Unit heaters. Clarage Fan Co., Kalamazoo, Mich.

Classic—Registers. Auer Register Co., Cleveland, O.

Clean Right—Soot destroyers. General Filters, Inc., Novi, Mich.

Clearview—Gages. Boston Machine Works Co., Lynn, Mass.

Clevite—Bearings. Cleveland Graphite Bronze Co., Cleveland, O.

Cliff—Boilers, water heaters. Terre Haute Boiler Works Co., Terre Haute, Ind.

Climate Changer—Unit air conditioners, unit air coolers. Trane Co., The, LaCrosse, Wis.

Climate-Lab—Test chambers. American Instrument Co., Inc., Silver Spring, Md.

Climatrol—Boilers, furnaces, heaters, fans, metallic ducts, air conditioning units. Mueller Furnace Co., L. J., Milwaukee, Wis.

Climax—Governors, regulators, strainers, steam traps, valves. Black-Sivalls & Bryson, Inc., Kansas City, Mo.

Clime-Matic—Unit air conditioner. United Conditioning Corp., New York, N. Y.

Clipper—Fans. Trade-Wind Motorfans, Inc., Los Angeles, Calif.

Clipper—Seals. Johns-Manville, New York.

Clorodine—Boiler cleaning compounds. American Chemical Paint Co., Ambler, Pa.

Closin—Bolts. Star Expansion Bolt Co., New York, N. Y.

Cocheo—Belting. Williams & Son, I. B., Dover, N. H.

Coeco—Controls and dampers. Combustion Equipment Co., Silvis, Ill.

Colalloy—Couplings, nipples, pipe. Colonial Alloys Co. Metals Div., Philadelphia, Pa.

Cold Generator—Chillers. Trane Co., The, La Crosse, Wis.

Coldjet—Unit coolers, air conditioning units. Industrial Mfg. & Engineering Co., Chicago.

Cold Stream—Unit coolers. Bakeraire Corp., South Windham, Me.

Coltemp—Insulation. Badham Insulation Co., Inc., Birmingham, Ala.

Columbia—Odor adsorbers, air conditioning units. Carbide and Carbon Chemicals Co., A Div. of Union Carbide and Carbon Corp., New York, N. Y.

Columbia—Ventilators. E. E. Souther Iron Co., St. Louis, Mo.

Combi-Matic—Burners. Siemon Mfg. Co., Kansas City, Mo.

Combustioneer—Stokers. Steel Products Engineering Co., Springfield, O.

Comet—Fans, unit heaters. New York Blower Co., Chicago, Ill.

Comet—Hoists. Chisholm-Moore Hoist Div., Columbus McKinnon Chain Corp., Tonawanda, N. Y.

Comfort Control—Temperature regulators. Bell & Gossett Co., Morton Grove, Ill.

Comfortaire—Air conditioning units. American Coils Co., Newark, N. J.

Comfortrol—Thermostats. Sullivan Valve & Engineering Co., Butte, Mont.

Comfostat—Thermostats. Johnson Service Co., Milwaukee, Wis.

Co-Min-Co—Insulating cement. United States Mineral Wool Co., Stanhope, N. J.

Compact-Boilers. Titusville Iron Works Co., The, Titusville, Pa.

Compass—Belting. Goodyear Tire & Rubber Co., Akron, O.

Compound Lever—Hand shears and snips. Bartlett Mfg. Co., Detroit, Mich.

Concavex—Bearings. Shafer Bearing Div. of Chain Belt Co., Downers Grove, Ill.

Conco—Boiler cleaning compounds, water treatment. Continental Products Co., Euclid, O.

Condor—Belting, V belts, pipe. Raybestos-Manhattan, Inc., Passaic, N. J.

Condo-Vac—Vacuum pumps. Chicago Pump Co., Chicago, Ill.

Conflex—Clad sheets. General Plate Div., Metals & Controls Corp., Attleboro, Mass.

Coni-Vane—Ventilators. Allen Ventilator Div., Production Planning Co., Rochester, Mich.

Conomotors—Duct and valve operators. Conoflow Corp., Philadelphia, Pa.

Conseco—Water chillers, tube cleaners, coils, compressors, condensers, oil coolers, dryers, heat exchangers, filters, headers, water heaters, joints, preheaters, pumps, separators, superheaters, tanks. Condenser Service & Engineering Co., Inc., Hoboken, N. J.

Conservo—Towers. Aqua-Therm, Inc. Dayton, O.

Consolidated—Valves. Manning, Maxwell & Moore, Inc., Stratford, Conn.

Constellation Line—Arc welders. Trindl Products, Ltd., Chicago, Ill.

Con-Tac-Tor—Switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Continental—Boilers. Boiler Engineering & Supply Co., Inc., Phoenixville, Pa.

Convector—Humidifiers. Maid-O'-Mist., Inc., Chicago, Ill.

Converto—Roof ventilators. Ammerman Co., C. L., Minneapolis, Min.

Conveyoflo—Conveyors. Builders-Providence, Inc., Providence, R. I.

Conveyor—Pulleys and sheaves. The American Pulley Co., Philadelphia, Pa.

Cool-A-Matic—Air conditioning units. Automatic Firing Corp., St. Louis, Mo.

Cooler-Aire—Window type cooling units. Artkraft Mfg. Co., Lima, O.

Coolero—Ventilators. Hirschman-Pohle Co., Inc., LeRoy, N. Y.

Coolite—Windows. Mississippi Glass Co., St. Louis, Mo.

Coolmaster—Unit coolers. Kramer Trenton Co., Trenton, N. J.

Cool Spot—Propeller fans. Signal Electric Mfg. Co., Menominee, Mich.

Copaltite—Cement and compounds, gaskets. National Engineering Products, Inc., Washington, D. C.

Cop-R-Loy—Sheets. Wheeling Steel Corp., Wheeling, W. Va.

Copr-fibre—Insulation. Forty-Eight Insulations, Inc., Aurora, Ill.

Copr-Tube—Fittings. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.

Copyflex—Blueprint machine. Bruning Co., Inc., Charles, Chicago, Ill.

Coravol—Corrosion treatment. Western Chemical Co., Kansas City, Mo.

Cor-In Galvanode—Electrolytic devices. Rotometals, San Francisco, Calif.

Cornelius—Air compressors and regulators. North Penn Co., New York, N. Y.

Corogard—Protective Coatings. Minnesota Mining & Mfg. Co., St. Paul, Minn.

Corosex—Water treatment. Research Products Corp., Madison, Wis.

Corox—Heaters. Westinghouse Electric Corp., Pittsburgh, Pa.

Corrodicide—Water treatment. Metropolitan Refining Co., Inc., Long Island City, N. Y.

Corrodine—Corrosion inhibition. Metropolitan Refining Co., Inc., Long Island City, N. Y.

Corrosanti—Corrosion inhibition. Dr. Adolph Schror, East Orange, N. J.

Cosmolubric—Refrigeration oil. Houghton & Co., E. F., Philadelphia, Pa.

Cotospray—Nozzles. J. F. Pritchard & Co., Kansas City, Mo.

Cotoid—Coatings. Lithgow Corp., Chicago, Ill.

Cottrell—Dust collectors. Research Corp., New York, N. Y.

Cottrell—Dust collectors. Western Precipitation Corp., Los Angeles, Calif.

Cox—Water heaters. O'Brien Steam Specialty Co., Inc., Syracuse, N. Y.

Coxe—Stokers. Combustion Engineering, Inc., New York, N. Y.

Co-Z-Air—Electric radiators. Conco Engineering Wks., Div. of H. D. Conkey & Co., Mendota, Ill.

Crescent—Boiler gage cocks, Wright-Austin Co., Detroit, Mich.

Croloy—Pipe, tubes, and tubing. Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.

Cromaloy—Solder. Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.

Cross-Flo—Dehydrators. Remco, Inc., Zelienople, Pa.

Crown—Cement and compounds. Colebrook & Sons, Inc., W. H., Syracuse, N. Y.

Crystals—Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.

Customair—Air conditioning units. Trane Co., The, La Crosse, Wis.

Custom Built—Unit air conditioners. Baker Refrigeration Corp., South Windham, Me.

Cut Master—Vertical turret lathes. Bullard Co., The, Bridgeport, Conn.

Cutno—Packing. Greene, Tweed & Co., North Wales, Pa.

Cuttrade—Electrodes. Eutectic Welding Alloys Corp., Flushing, New York, N. Y.

Cycloidal—Air washers. Blower Application Co., Milwaukee, Wis.

Cycoil—Filters. American Air Filter Co., Louisville, Ky.

Cyclone—Exhaust heads. Wright Austin Co., Detroit, Mich.

Cyclone—Hoists. Chisholm-Moore Hoist Div., Columbus McKinnon Chain Corp., Tonawanda, N. Y.

Cyclops—Roller bearings. Roller Bearing Co of America, West Trenton, N. J.

DFN—Dehydrators, filters. McIntire Co., The, Newark, N. J.

DH—Ball bearings. Dodge Mfg. Corp., Mishawaka, Ind.

D.I.P.—Insulation, piping. Durant Insulated Pipe Co., Palo Alto, Calif.

D.I.P.—Insulation, piping. Durant International Corp., Williamstown, N. J.

D-O—Adsorbers. Research Products Corp., Madison, Wis.

D-O Kote—Adsorbers. Research Products Corp., Madison, Wis.

Daptoblu—Gas burners. Beck Engineering Combustion Kompany, St. Louis, Mo.

Dart—Unions. Fairbanks Co., The, New York, N. Y.

Day-Nite Acratherm—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Day-Steel—Pulleys. Dayton Rubber Co., Dayton, O.

Dean—Cleaners. Pierce Co., Wm. B., The, Buffalo, N. Y.

Debecote—Coatings. Debevoise Co., The, Brooklyn, N. Y.

Deflectrol—Turning vanes. Barber-Colman Co., Rockford, Ill.

Defrostolator—Hot gas defrosting systems. Tenney Engineering, Inc., Newark, N. J.

Delta—Boilers. Zingham Co., William C., Chicago, Ill.

Demandtrol—Valves. Sullivan Valve & Engineering Co., Butte, Mont.

Demon Air-Set—Refractories. Plibrico Firebrick Co., Chicago, Ill.

Densitron—Alarms. Ripley Co., Inc., Middletown, Conn.

Deoxidine—Cleaning compounds. American Chemical Paint Co., Ambler, Pa.

Dereka—Protective coatings. Debevoise Co., The, Brooklyn, N. Y.

Desert Air—Burners, heaters. Central States Mfg. Co., Inc., Arkansas City, Kan.

Desmond-Simplex—Pipe vises. Desmond-Stephan Mfg. Co., Urbana, O.

Desomatic—Dehumidifiers. Daly, Merritt & Sullivan, Inc., Falls Church, Va.

De-Sta-Co.—Fan housings, pipe clamps, valves. Detroit Stamping Co., Detroit, Mich.

Detect-A-Fire—Controls. Fenwal Inc., Ashland, Mass.

Detroit—Traps. Nason Co., Clarkston, Mich.

Detroit LoStoker—Stokers. Detroit Stoker Co., Detroit, Mich.

Detroit Rotograte Stoker—Stokers. Detroit Stoker Co., Detroit, Mich.

Detroit Rotostoker—Stokers. Detroit Stoker Co., Detroit, Mich.

Detroit Unistoker—Stokers. Detroit Stoker Co., Detroit, Mich.

Dexter—Valve reseaters, air separators, steam traps. Leavitt Machine Co., Orange, Mass.

Di-Acro—Benders, brakes, machines, shears. O'Neil Irwin Mfg. Co., Lake City, Minn.

Dial—Regulators. Parker-Kalon Div., General American Transportation Corp., New York, N. Y.

Dial-A-Speed—Motors. Brown-Brockmeyer Co., Inc., Dayton, O.

Dialco—Pilot and signal lights. Dialight Corp., Brooklyn, N. Y.

Dialon—Radiator valves, Bridgeport Brass Co., Bridgeport, Conn.

Diamond—Compounds, enamels and lacquers. Thompson and Co., Oakmont, Pa.

Diamond Eye—Glasses. Imperial Brass Mfg. Co., Chicago, Ill.

Diamond Fibre—Gaskets. Continental Diamond Fibre Co., Newark, Del.

Diamond H—Switches, thermostats, relays. Hart Mfg. Co., Hartford, Conn.

Diaphlex—Bellows, relays, solenoids, and switches. Cook Electric Co., Chicago, Ill.

Dia Seal—Valves. Imperial Brass Mfg. Co., Chicago, Ill.

Dickbelt—Belting and drives. Dick Co., Inc., R. & J., Passaic, N. J.

Dickinson Ferrocast—Exhaust heads. Brighton-Dickinson Div., Chicago, Ill.

Dickrope—V belts and drives. Dick Co., Inc., R. & J., Passaic, N. J.

Dickvalve—Valves. Dick Co., Inc., R. & J., Passaic, N. J.

Diesel American—Oil burners. Diesel Oil Burner Corp. of New York, Jamaica, Long Island, N. Y.

Dieselite—Corrosion prevention. Metropolitan Refining Co., Inc., Long Island City, N. Y.

Diffusaire—Diffusers. Hart & Cooley Mfg. Co., Holland, Mich.

Dilecto—Plastic pipe and tubing. Continental Diamond-Fibre Co., Newark, Del.

Dill—Testers. Trion, Inc., McKees Rocks, Pa.

Direct—Pipe fittings and flanges. Straight Line Foundry & Machine Corp., Direct Separator Div., The, Syracuse, N. Y.

Directrol—Vanes. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.

Discfin—Cooling surface. General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.

Disc-Loc—Registers. Knowles Mushroom Ventilator Co., Upper Montclair, N. J.

Distributor—Radiation. Kehm Corp., The, Chicago, Ill.

Divco—Fittings, coils, pipe and tubing, sheets, plugs, solder, valves. Division Lead Co., Summit, Ill.

Dixigas—Gas welding rod. Atlantic Steel Co., Atlanta, Ga.

Dixisteel—Pipe hangers and supports, angles, flanges. Atlantic Steel Co., Atlanta, Ga.
Do-All—Combination hammer and drill. Wodack Electric Tool Corp., Chicago, Ill.
Do-Mor—Saw tools. Pioneer Tool Co., Racine, Wis.
Dominion—Gaskets, packing. Darcoid Co., Inc., New York, N. Y.
Dorex—Adsorbers. Connor Engineering Corp., Danbury, Conn.
Doro-Chrome—Benders, cutters, tools, wrenches. Duro Metal Products Co., Chicago, Ill.
Double Check—Boiler compounds. Hampton-Cross Co., The, Louisville, Ky.
Double Diamond—Hygrometers, recorders, psychrometers. H-B Instrument Co., Philadelphia, Pa.
Double-Flow—Cooling towers. Marley Co., Inc., The, Kansas City, Mo.
Double-Seal—Copper tube fittings. Hays Mfg. Co., Erie, Pa.
Doubleton—Pumps. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Double U—Packing. Wayne Davies & Co., Westboro, Mass.
Dowmetal—Sheets, tubing, welding rod. Dow Chemical Co., Midland, Mich.
Dowtherm—Systems. Dow Chemical Co., The, Midland, Mich.
Downblast—Unit heaters. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Dowtherm—Process heating systems. Dow Chemical Co., The, Midland, Mich.
Draft-A-Justor—Draft controls. Preferred Utilities Mfg. Corp., New York, N. Y.
Draftender—Regulators Penn Controls, Inc., Goshen, Ind.
Draft-O-Stat—Barometric controls. Hotstream Heater Co., Cleveland, O.
Draftstop—Ventilators. American Air Filter Co., Inc., Herman Nelson Products, Louisville, Ky.
Draftrite—Gages. Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Draftrite—Gages. Cole-Sewell Engineering Co., St. Paul, Minn.
Drainator—Traps. Coe Mfg. Co., Painesville, O.
Drain-Dri—Sump pumps. Yeomans Bros. Co., Melrose Park, Ill.
Draintrol—Traps. Schaub Engineering Co., Fred H., Chicago, Ill.
Dresserell—Fittings. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Dricooler—Heat exchangers. Marley Co., Inc., The, Kansas City, Mo.
Dri-Pipe—Insulation. Mystik Adhesive Products, Div. of Chicago Show Printing Co., Chicago, Ill.
Dripump—Pumps. Peerless of America, Inc., Chicago, Ill.
Drive-IT—Hangers and supports, drills, Powder Power Tool Corp., Portland, Ore.
Dri-vent—Radiator air valves. Frank D. Riggio Co., Rutherford, N. J.
Dry-Ex—Water chillers. Acme Industries, Inc., Jackson, Mich.
Dryfol—Building insulation. Reflectal Corp., New York, N. Y.
Dry-Ice—Refrigerants. Pure Carbonic, Inc., Div. of Air Reduction Co., Inc., New York.
Dry-Steam—Cleaning compounds. Utility Laboratory, Inc., Brooklyn, N. Y.
Dryvin—Expansion bolts. Star Expansion Bolt Co., New York, N. Y.
Dualarc—Arc Welders. Electric Arc, Inc., Newark, N. J.
Dual-Clone—Dust collectors. Day Co., The, Minneapolis, Minn.
Dual-Dial—Gages. Rochester Mfg. Co., Inc., Rochester, N. Y.
Dual-A-Fire—Burners. Automatic Firing Corp., St. Louis, Mo.
Dualene—Fuel oil treatment. Allen Co., Robert G., Mechanicsville, N. Y.
Dualsteel—Unions. Rockwood Sprinkler Co., Worcester, Mass.
Dualvent—Roof ventilators. Octagon Ventilator Co., Chicago, Ill.
Duboth—Boiler water treatment. Metropolitan Refining Co., Inc., Long Island City, N. Y.
Duclone—Cyclone dust collectors. Ducon Co., The, Mineola, N. Y.
Duco—Enamels and lacquers, du Pont de Nemours & Co., (Inc.), E. I., Fabrics & Finishes Dept., Wilmington, Del.
Ductatherm—Thermostats. Mercoid Corp., The, Chicago, Ill.
Ducturns—Vanes. Tuttle & Bailey, Inc., New Britain, Conn.
Ductype—Fans. South Bend Air Products, Inc., South Bend, Ind.
Dulux—Enamels and lacquers. du Pont de Nemours & Co., (Inc.) E. I., Fabrics & Finishes Dept., Wilmington, Del.
Dum Dum—Sealing compounds. Arco Co., The, Cleveland, O.
Duo Blo—Air heaters. American Furnace Co., St. Louis, Mo.
Duoflo—Pipe line strainers. Sheffler-Gross Co., Philadelphia, Pa.
Duonetic—Gas and oil burners. Webster Engineering Co., Tulsa, Okla.
Duo-Stat—Heating systems, thermostats. Johnson Service Co., Milwaukee, Wis.
Duotrol—Regulators, switches. Automatic Control Co., St. Paul, Minn.
Duplex—Insulation. Keasbey & Mattison Co., Ambler, Pa.
Duplex—Pipe cutting machines. Bignall & Keeler Div., John Ramming Machine Co., St. Louis, Mo.
Durabilt—Observation ports, conveyors. Chicago Fire Brick Co., Chicago, Ill.
DuraBilt—Registers. Auer Register Co., Cleveland, O.
Duradiant—Gas burners. Selas Corp. of America, Philadelphia, Pa.
Dura-Flex—Registers. Auer Register Co., Cleveland, O.
Duraflex—Stokers. Canton Stoker Corp., Canton, O.
Dura-Line—Registers. Auer Register Co., Cleveland, O.
DuraSpeed—Sprinkler heads. Grinnell Co., Inc., Providence, R. I.
Duratex—Protective coatings. National Pipe Coatings Inc., Huntington Park, Calif.
Durco—Fans, fittings, pipe, valves. Duriron Co., Inc., Dayton, O.
Durcopump—Fans, fittings, pipe, valves. Duriron Co., Inc., Dayton, O.
Durex—Bearings. Moraine Products Div., General Motors Corp., Dayton, O.
Durichlor—Fans, fittings, pipe, valves. Duriron Co., Inc., Dayton, O.
Duridine—Protective coatings. American Chemical Paint Co., Ambler, Pa.
Durimet—Fans, fittings, pipe, valves. Duriron Co., Inc., Dayton, O.
Duro-Blade—Regulators. Duro-Dyne Corp., Hempstead, L. I., N. Y.
Durobrace—Pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Dustav—Filters. Air-Maze Corp., Cleveland, O.
Dust King—Dust collectors. Dust Filter Co., Chicago, Ill.
Dustkop—Dust collectors. Aget-Detroit Co., Ann Arbor, Mich.
Dust-Stop—Air Filters. Owens-Corning Fiberglas Corp., Toledo, O.
Dustube—Dust collectors. American Wheelabrator & Equipment Corp., Mishawaka, Ind.
Dutch Boy—Solder, enamels and lacquers. National Lead Co., New York, N. Y.
Duxbak—Leather belting and packing. Schieren Co., Chas. A., New York, N. Y.
Dux-Sulation—Insulation. Grant Wilson, Inc., Chicago, Ill.
Dy-Chek—Dye penetrant. Turco Products, Inc., Los Angeles, Calif.
Dynafan—Roof ventilators. Penn Ventilator Co., Philadelpdia, Pa.
Dynaflow—Fans. South Bend Air Products, Inc., South Bend, Ind.
Dyna-Line—Electric motors, reducers. Brown-Brockmeyer Co., Inc., Dayton, O.
Dynamaster—Recorders. Bristol Co., The, Waterbury, Conn.
Dynapump—Circulators, pumps. Fostoria Pressed Steel Corp., Magnetic Pump Div., Fostoria, O.
Dyna-Speed—Electric motors. Brown-Brockmeyer Co., Inc., Dayton, O.
Dynatrade—Electrodes. Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
Dynetic—Gas burners. Webster Engineering Co., Tulsa, Okla.
Dynetric—Balancing equipment. Gisholt Machine Co., Madison, Wis.

E.A.D.—Motors. Eastern Air Devices, Inc., Brooklyn, N. Y.
E-C—V belts. Goodyear Tire & Rubber Co., Akron, O.
E C & M—Motor controls, switches. Electric Controller & Mfg. Co., Cleveland, O.
EMD—Blowers. L. J. Wing Mfg. Co., Linden, N. J.
E-Z—Registers, regulators. Acme Mfg. Co., Philadelphia, Pa.
E.Z.—Hangers or brackets, inserts, soot destroyers. Healey Ruff Co., St. Paul, Minn.
Eastern—Tanks. Case & Son Mfg. Co., W. A., Buffalo, N. Y.
Easy-Flo—Solder. Handy & Harman, New York, N. Y.
Ebko—Conduit, exchangers, pipe. Kaiser Co., E. B., Glenview, Ill.
Eclipse—Reciprocating compressors. Frick Co., Waynesboro, Pa.
Econofeed—Pumps, systems. Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Econ-O-Flow—Furnaces. U. S. Machine Corp., Div. of Stewart-Warner Corp., Lebanon, Ind.
Econ-O-Matic—Motor bases. American Pulley Co., The, Philadelphia, Pa.
Economist—Boilers. Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Economite—Commercial and industrial gas burners. Mid-Continent Metal Products Co., Chicago, Ill.
Economizer—Nozzles. Bahnson Co., Winston-Salem, N. C.
Economy—Unit ventilators. Arex Co., Chicago, Ill.
Econostat—Heating systems. Barber-Colman Co., Rockford, Ill.
Econotherm—Boilers. Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Econovent—Ventilators. Western Engineering & Mfg. Co., Venice, Calif.
Edco—Heaters, air conditioning units. Cauhorn Distributing Co., Detroit, Mich.
Eddy—Stokers. Eddy Stoker Corp., Chicago
Edgeseal—Air filters. Wilson & Co., Inc., Chicago, Ill.
Edgetallic—Gaskets. Darcoid Co., Inc., New York, N. Y.
Effico—Ventilators. Hirschman-Pohle Co., Inc., LeRoy, N. Y.
"88"—Pipe covering. Eagle-Picher Co., Cincinnati, O.
Elastic Metallic—Packing. Chesterton Co., A. W., Everett, Mass.
Elasto Rib—Vibration isolating bases. Korfund Co., Inc., Long Island City, N. Y.
Elaterite—Coatings. Ohmlac Paint & Refining Co., Inc., Long Island City, N. Y.
Electranik—Indicator-controllers. Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Electric Filter Watchman—Gages. Herbusch Corp., The, St. Louis, Mo.
Electric Water Boy—Sump pumps. Weil Pump Co., Chicago, Ill.
Electrifugal—Centrifugal pumps. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Electro-Airmat—Air cleaners. American Air Filter Co., Inc., Louisville, Ky.
Electro-Cell—Air cleaners. American Air Filter Co., Inc., Louisville, Ky.
Electroflo—Valves. Hays Mfg. Co., Erie, Pa.
Electrofluid—Hydraulic speed changers. Link-Belt Co., Philadelphia, Pa.
Electro-Klean—Air cleaners. American Air Filter Co., Inc., Louisville, Ky.
Electro-Mist Collector—Air cleaners. American Air Filter Co., Inc., Louisville, Ky.
Electro-Pl—Air cleaners. American Air Filter Co., Inc., Louisville, Ky.
Electro-Rod—Pipe cleaning machines. Spartan Tool Co., Chicago, Ill.
Electro-Sheet—Sheets. American Brass Co., Waterbury, Conn.
Electro-Shield—American Cladmetals Co., Carnegie, Pa.
Electro-Staynew—Air cleaners. Dollinger Corp., Rochester, N. Y.
Electroweld—Welders. Electric Arc., Inc., Newark, N. J.
Electro-Wind—Ventilators. Allen Ventilator Div., Production Planning Co., Rochester, Mich.
Electrunite—Stainless steel tubing and pipe, tubing benders. Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Elesco—Superheaters. Combustion Engineering, Inc., New York, N. Y.
Elgex—Steam system treatment. Elgin Softener Corp., Elgin, Ill.
Elgin—Arc welders. Borm Mfg. Co., Elgin, Ill.
Elgin—Louvers and shutters. Elgo Shutter & Mfg. Co., Detroit, Mich.
Elm—Dampers. Elgo Shutter & Mfg. Co., Detroit, Mich.
Elsco—Blowers, compressors, pumps, valves. Electric Sprayit Co., The, Sheboygan, Wis.
Embee—Cement and compounds. Montgomery Bros., San Francisco, Calif.
Emco—Meters, regulators. Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., Pittsburgh, Pa.
Emd-Com—Blowers. Wing Mfg. Co., L. J., Linden, N. J.
Empire—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Empire—Water meters. Rockwell Mfg. Co., Meter & Valve Div., Pittsburgh, Pa.
Enamel-Kote—Enamels and lacquers. Acme White Lead & Color Works, Detroit, Mich.
Enco—Burners, regulators, cooling units. Engineer Co., New York, N. Y.
Enduro—Sheets, tubing, pipe. Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Enduro—Unions. Jefferson Union Co., Inc., New York, N. Y.
Entrained Combustion—Gas burners. Mettler Co., Inc., The, Los Angeles, Calif.
Eonite—Fittings, pipe. Aqua-Therm, Inc., Dayton, O.
Equatemp—Balancing valves. Ohio Brass Co., Mansfield, O.
Equiflo—Valves. Grinnell Co., Inc., Providence, R. I.
Eroduct—Insulation. Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Esco—Fittings, flanges, pipe, exchangers. Electric Steel Foundry Co., Portland, Ore.
Esco Spuncast—Pipe, tubing. Electric Steel Foundry Co., Portland, Ore.
Ermeto—Fittings. Weatherhead Co., The, Cleveland, O.
Esna—Nuts. Elastic Stop Nut Corp. of America, Union, N. J.
Esso—Oil burners, heaters. Gilbert & Barker Mfg. Co., West Springfield, Mass.

Esso Bond—Cement, refractories. Ramtite Co., The, Chicago, Ill.
Eutec-Arc—Arc welders, welding and cutting apparatus. Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
EuteCrod—Welding compounds, rods, solder. Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
Eutec-TinWeld—Solder. Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
Eutector—Welding compounds. Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
Eutecto-Mask—Compounds. Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
EutecTorch—Torches, welding and cutting apparatus. Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
EutecTrode—Welding electrodes. Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
Evactor—Pumps. Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Evanaction—Valves. Taylor Instrument Companies, Rochester, N. Y.
Everbrite—Paint. Warren Refining & Chemical Co., The, Cleveland, O.
Everflex—Hose, coils, and tubing. Everhot Products Co., Chicago, Ill.
Everjet—Coatings. Barrett Div., Allied Chemical & Dye Corp., New York, N. Y.
Everlasting—Bolts and studs. H. M. Harper Co., Morton Grove, Ill.
Eversharp—Cutters. Everhot Products Co., Chicago, Ill.
Evertite—Clamps. Everhot Products Co., Chicago, Ill.
Evrtyte—Valves. Strong, Carlisle & Hammond Co., Cleveland, O.
Excel—Unions. Jefferson Union Co., Inc., New York, N. Y.
Excelsior—Pumps. Foster Pump Works, Inc., Brooklyn, N. Y.
Excelso—Water heaters. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Exhaustair—Fans. New York Blower Co., Chicago, Ill.
Exidust—Dust collectors. Lamson Corp., Blower Div., Syracuse, N. Y.
Expando—Tube expanders. Knuth Engineering Co., Chicago, Ill.
Expand-R-Strap—Fasteners. Gerrard & Co., A. J., Melrose Park, Ill.
Expelsor—Ejectors. Yeomans Bros. Co., Melrose Park, Ill.
Extra Dry Esotoo—Liquid sulphur dioxide. Virginia Smelting Co., West Norfolk, Va.
Eye-Hye—Indicators. Reliance Gauge Column Co., Cleveland, O.
E-Z—Cutters. Gaines-Collins, Quijada Tool Division, Los Angeles, Calif.
E-Z—Hangers and Supports, regulators. Acme Mfg. Co., Holmesburg, Philadelphia, Pa.
Ez-arc—Arc welders. Will-Weld Mfg. Co., Inc., Omaha, Neb
Ezkleen—Filters. Research Products Corp., Madison, Wis.
E-Z-On—Regulators. Gerrett Corp., M. A., Milwaukee, Wis.
E-Z See—Glasses. Remco, Inc., Zelienople, Pa.
Ezy-Kleen—Strainers. Blackmer Pump Co., Grand Rapids, Mich.

F & E—Stokers. Flynn & Emrich Co., Baltimore, Md.
FS—Bellows. Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
F & T—Boilers. Farrar & Trefts, Buffalo, N. Y.
Fabrikated—Grilles, registers. Independent Register Co., Cleveland, O., New York.
Faceweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.
Faessler—Tube expanders, tube flaring tools. Key Co., East St. Louis, Ill.
Fairco-Braze—Valves. Fairbanks Co., The, New York, N. Y.
Faircoseal—Valves. Fairbanks Co., The, New York, N. Y.
Fan-Air—Gas burners. Mettler Co., Inc., The, Los Angeles, Calif.
Fanmix—Burners. Coppus Engineering Corp., Worcester, Mass.
Fan-Pac—Fans. DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Far-Air—Air conditioning units, filters, humidifiers. Farr Co., Los Angeles, Calif.
Farragut—Packing. Darcoid Co., Inc., New York, N. Y.
Fast's—Couplings. Koppers Co., Inc., Metal Products Div., Baltimore, Md.
FauceHot—Heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Favorite—Ratchet wrenches. Greene. Tweed & Co., North Wales, Pa.
Featherfin—Heating and cooling surface, unit coolers. Wing Mfg. Co., L. J., Linden, N. J.
Featherweight—Insulation. Keasbey & Mattison Co., Ambler, Pa.
Feather Weight—Exchangers. Clifford Mfg. Co., Div. of Standard-Thomson Corp., Waltham, Mass.
Featherweight—Unit heaters. Wing Mfg. Co., L. J., Linden, N. J.
Feedrator—Chemical feeders. Fischer & Porter Co., Hatboro, Pa.
Fel-Pro—Gaskets, packing. Felt Products Mfg. Co., Chicago, Ill.
Felt Cote—Metal Sheets. American Steel Band Co., Pittsburgh, Pa.
Fenn's Rotary—Ventilators. Waverly Heating Supply Co., Boston, Mass.
Ferrenewo—Valves. Lunkenheimer Co., Cincinnati, O.
Ferrodex—Compounds. MacDermid Chemical Co., Bristol, Conn
Ferro-Therm—Insulation. American Flange & Mfg. Co., New York, N. Y.
Ferroweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Fiberglas—Insulation, tape. Owens-Corning Fiberglas Corp., Toledo, O.
Fiberlite—Insulation. Insulite Co., Minneapolis, Minn.
Fibron—Plastic tubing, plastic pipe. Irvington Varnish & Insulator Div. of Minnesota Mining & Mfg. Co., Irvington, N. J.
Filterpure—Cooling surface, unit coolers. Betz Corp., Hammond, Ind.
Fil-Thru—Gages. Applied Mechanics Co., Boston, Mass.
Filt-R-Ite—Himelblau Associates, Inc. Chicago, Ill.
Filt-R-Stil—Water treatment. American Cyanamid & Chemical Corp., New York, N. Y.
Filter Watchman—Air filter gages. Research Products Corp., Madison, Wis.
Findlay—Stokers. Central Rubber & Steel Corp., Findlay, O.
Fine-Screen—Strainers. Yarnall-Waring Co., Philadelphia, Pa.
Fin-Fans—Oil coolers. Fluor Corp., Ltd., The, Los Angeles, Calif.
Fin-Flex—Registers. Auer Register Co., Cleveland, O.
Finfold—Cooling surface. Pleasantaire Corp., Washington, D. C.
Finger Strap—Fasteners. Gerrard & Co., A. J., Melrose Park, Ill.
Finmaster—Radiation. Smith Co., Inc., H. B., The, Westfield, Mass.
Finnflex—Bases and pads, absorbers. Finn & Co., New York, N. Y.
Firecrete—Refractories. Johns-Manville, New York, N. Y.
Firefoil—Insulating panel. Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Fire-Guard—Industrial stokers. Eddy Stoker Corp., Chicago, Ill.
Fire-Hearth—Refractories. Fireline Stove & Furnace Lining Co., Chicago, Ill.
Fireite—Furnace cement, refractories. Johns-Manville, New York, N. Y.
Fireset—Refractories. Walsh Refractories Corp., St. Louis, Mo.
Fire Tender—Stokers. Holcombe & Hoke Mfg. Co., Inc., Indianapolis, Ind.
Fireye—Flame failure controls, systems. Combustion Control Corp., Boston, Mass.
Firma—Glasses. Chesterton Co., A. W., Everett, Mass.
Firma—Ventilators. Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Firomatic—Filters, gages, links, switches, valves. Morse-Smith-Morse, Inc., Watertown, Mass.
Fitrite—Tools, roof ventilators. Levow, David, New York, N. Y.
Flame Buster—Spray nozzles. Grinnell Co., Inc., Providence, R. I.
Flame-otrol—Controls. Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.
Flange-Jacks—Separators. Williams & Co., J. H., Buffalo, N. Y.
Flaremaster—Benders. Everhot Products Co., Chicago, Ill.
Flash-Off—Welding compounds. Acme White Lead & Color Wks., Detroit, Mich.
Flat-Belt—Pulleys and sheaves. The American Pulley Co., Philadelphia, Pa.
Flatjet—Spray nozzles. Spraying Systems Co., Bellwood, Ill.
Fleet-Line—Motors. Brown-Brockmeyer Co., Inc., Dayton, O.
Fleetweld—Welding electrodes. Lincoln Electric Co., Cleveland, O.
Fleetwelder—Welders. Lincoln Electric Co., Cleveland, O.
Fleet-X—Enamels and lacquers. Acme White Lead & Color Works, Detroit, Mich.
Flex—Nipples. Techniflex Corp., Port Jervis, N. Y.
Flexarc—Arc welders. Westinghouse Electric Corp., Pittsburgh, Pa.
Flexcell—Bases and pads. Celotex Corp., The, Chicago, Ill.
Flexfast—Hose clamps. Flexible Tubing Corp., Guilford, Conn.
Flexflyte—Duct fittings. Flexible Tubing Corp., Guilford, Conn.
Flexiblac—Protective coatings. Samuel Cabot, Inc. Boston Mass.
Flexi-Duct—Connections. Grant Wilson, Inc., Chicago, Ill.
Flexidur—Nozzles. Bahnson Co., Winston-Salem, N. C.
Flexiflo—Diffusers. Universal Diffuser Corp., New York, N. Y.
Flexfelt—Insulation. National Gypsum Co., Buffalo, N. Y.
Flex-i-liner—Rotary pumps. Vanton Pump & Equipment Corp., New York, N. Y.
Flexloc—Lock nuts. Standard Pressed Steel Co., Jenkintown, Pa.
Flexodisc—Expansion joints. Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Flexon—Bellows, pipe joints, ducts. Flexonics Corp., Maywood, Ill.
Flexpansion—Fittings and hose. Techniflex Corp., Port Jervis, N. Y.
Flexpin—Couplings. Smith & Serrell, Inc., Newark, N. J.
FlexRing—Couplings. Smith & Serrell, Inc., Newark, N. J.
Flexitite—Gate valves. Ohio Brass Co., Mansfield, O.
Flex-Tube—Analyzers, gages, manometers, switches, pilot tubes. Dwyer Mfg. Co., F. W., Chicago, Ill.
Flo—Dehydrant and acid neutralizer, for refrigerating systems. Allin Mfg. Co., Chicago, Ill.
Floatrol—Switches, regulators. Automatic Control Co., St. Paul, Minn.
Flochek—Valves. Taco Heaters, Inc., Providence, R. I.
Flocold—Unit coolers. Drayer-Hanson, Inc., Los Angeles, Calif.
Flo-Controls—Fittings. General Heaters & Regulators Co., East Chicago, Ind.
Floetless—Sump pumps. Imperial Brass Mfg. Co., Chicago, Ill.
Floguide—Flow meters, Fischer & Porter Co., Hatboro, Pa.
Flo-Klean—Filters, strainers. Cuno Engineering Corp., Meriden, Conn.
Flo-Master—Valves. General Heaters & Regulators Co., Chicago, Ill.
Flo-Matic—Conveyors, stokers. American Coal Burner and Wood Stoker Corp., Chicago.
Floor-Level—Radiation. Rempe Co., Chicago, Ill.
Florite—Air velocity meters. Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Flor-Line—Radiation, condensers. Hooper Engineering Co., Liberty Center, O.
Flo-Scope—Meters. Selas Corp. of America, Philadelphia, Pa.
Flo-tee—Hot water heating systems fittings. Hi-Flow Products, Inc., Lindenhurst, N. Y.
Flotrol—Humidifiers, valves. Cleveland Humidifier Co., Cleveland, O.
Flo-Tube—Conveyors. Canton Stoker Corp., Canton, O.
Flo-watch—Flow meters. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Flow-Cold—Water chillers. Acme Industries, Inc., Jackson, Mich.
Flowline—Pipe fittings. Welding Fittings Corp., New Castle, Pa.
Flowrator—Meters, systems. Fischer & Porter Co., Hatboro, Pa.
Flow-Temp—Air conditioning Units. Acme Industries, Inc., Jackson, Mich.
Flualyzer—Analyzers. Engelhard, Inc., Chas., Newark, N. J.
Fluid Fortress—Fittings. Flodar Corp., Cleveland, O.
Fluid Joists—Coils. Fricke, Fred J., Albuquerque, N. M.
Fluidyne—Pumps. Peerless Pump Div., Food Machinery and Chemical Corp., Los Angeles, Calif.
Fluoroflex—Tubing. Resistoflex Corp., Belleville, N. J.
Flush-Kleen—Sewage ejectors and pumps. Chicago Pump Co., Chicago, Ill.
Flux-Stik—Solder and fluxes. Lake Chemical Co., Chicago, Ill.
Foambuster—Compounds. Cannon Chemical Co., Inc., Cambridge, Mass.
Foamglas—Insulation. Armstrong Cork Co., Lancaster, Pa.
Foamglas—Insulation. Pittsburgh Corning Corp., Pittsburgh, Pa.
Foamglas—Insulation. Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Force-Flo—Circulators, fittings, heaters, regulators, tanks. Kehm Corp., The, Chicago.
Force-Flo—Unit heaters. Trane Co., The, LaCrosse, Wis.
Form-A-Gasket—Cement and compounds. Permatex Co., Inc., Brooklyn, N. Y.
Form-A-Jig—Compounds. Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
Formet—Water treatment. Perolin Co., Inc., Chicago, Ill.
Fosco—Water heaters. Schoedinger, F. O., Columbus, O.
4-Point—Control systems. Perfex Corp., Milwaukee, Wis.
"400" Series—Heaters. Fitzgibbons Boiler Co., Inc., New York, N. Y.
4-Star—Adhesive tape. Johns-Manville, New York, N. Y.
Fox—Regulators. Climax Metal Products Co., Cleveland, O.
Fracto-Crete—Refractories. Ramtite Co., The, Chicago, Ill.
Francke—Flexible couplings. Waldron Corp.,

John, New Brunswick, N. J.
Francke Parts—Couplings. Smith & Serrell, Inc., Newark, N. J.
Free-Aire—Air conditioning units, heaters. Kehm Corp., The, Chicago, Ill.
Free-Flow—Ventilators. Burt Mfg. Co., Akron, O.
Fre-Flo—Strainers. Fisher Governor, Marshalltown, Ia.
Freon—Refrigerants. E. I. du Pont de Nemours & Co., Inc., "Kinetic" Chemical Div., Wilmington, Del.
Fresh Air Maker—Propeller fans, units. Schwitzer-Cummins Co., Indianapolis, Ind.
Frevent—Valves. Bridgeport Brass Co., Bridgeport, Conn.
Frictionized—Belting. Baldwin Belting, Inc., New York, N. Y.
Frigid—Propeller fan blades and fans, dehumidifiers, welding fume exhausters, paint spray booths, air conditioning units. Circulators & Devices Mfg. Corp., Brooklyn, N. Y
Frigid-Capri—Air conditioning units. Frigid, Inc., Brooklyn, N. Y.
Frigistat—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Frogalloy—Electrodes. McKay Co., Pittsburgh, Pa.
Frost-Tite—Fittings. Remco, Inc., Zelienople, Pa.
Fuelguard—Commercial and industrial burners. Fuelguard Co., Dallas, Tex.
Fuelguard—Regulators. Ashcraft Co., J. P., Dallas, Tex.
Fuel Saver—Boilers. International Boiler Works Co., The, East Stroudsburg, Pa.
Fueltone—Fuel oil treatment. Ampion Corp., Long Island City, N. Y.
Fulflo—Filters. Commercial Filters Corp., Melrose, Mass.
Fulgrip—Pulleys and sheaves. Maurey Mfg. Corp., Chicago, Ill.
Fulljet—Spray nozzles. Spraying Systems Co., Bellwood, Ill.
Fulscope—Recorders, recorder-controllers, regulators. Taylor Instrument Companies, Rochester, N. Y.
Fuseair—Air diffusers. Aladdin Heating Corp., San Leandro, Calif.
Fusionweld—Tubing. Avon Tube Div., Highbe Mfg. Co., Rochester, Mich.
Fusomatic—Links. Preferred Utilities Mfg. Corp., New York, N. Y.
Fybr-Tech—Gaskets and sheets. Technical Ply-Woods, Chicago, Ill.
Fyr-Feeder—Stokers. American Coal Burner and Wood Stoker Corp., Chicago, Ill.
Fyrite—Analyzers, combustion testing kits. Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Fyrite—Recorders. Cole-Sewell Engineering Co., St. Paul, Minn.
Fyritec—Recorders. Cole-Sewell Engineering Co., St. Paul, Minn.

GB—Fans. General Blower Co., Morton Grove, Ill.
G. B. C.—Gages, regulators. General Blower Co., Inc., Philadelphia, Pa.
G-E—Compressors, condensers, thermostats. General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
G-Fin—Cooling and heating surface. Griscom-Russell Co., The, Massillon, O.
GIL—Filters, regulators. Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
GIL Governoret—Valves. Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
GIL No-Hum—Check valves. Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
G. P.—Smoke density recorders, analyzers, combustion control systems. General Power Plant Corp., Ossining, N. Y.
G-R—Aftercoolers, oil coolers, water chillers, regulators, exchangers. Griscom-Russell Co., The, Massillon, O.
G S—Anemometers, indicators, psychrometers, torches, welding apparatus. General Scientific Equipment Co., Philadelphia, Pa.
Gaco—Couplings. Gates Engineering Co., Wilmington, Del.
Gaco-Neoprene—Coatings, fittings, pipe. Gates Engineering Co., Wilmington, Del.
Gagetron—Regulators. Instruments, Inc., Tulsa, Okla.
Galbestos—Sheet metal. Robertson Co., H. H., Pittsburgh, Pa.
Galongage—Gages. Applied Mechanics Co., Boston, Mass.
Galv-O-Zinc—Coatings. Blue Ridge Talc Co., Inc., Henry, Va.
Gasgun—Torches. Century Aircraft, Los Angeles, Calif.
Gas-A-Fire—Burners. Automatic Firing Corp., St. Louis, Mo.
Gas-O-Matic—Gas burners. Williams Div., Eureka Williams Corp., Bloomington, Ill.
Gas Pak—Welding rod. Marquette Mfg. Co., Minneapolis. Minn.
Gask-o-Seal—Gaskets. Wolfe Co., Inc., The, Franklin C., Culver City, Calif.
Gast—Filters, separators. Johnson Corp., The, Three Rivers, Mich.
Gasteam—Radiators. Clow & Sons, James B., Chicago, Ill.
Gasweld—Torches, regulators, welding rod and apparatus. Liquid Carbonic Corp., The, Chicago, Ill.
Geddes—Radiation. Fowler & Wolfe Radiator Co., Norristown, Pa.
Gehl—Stokers. Eddy Stoker Corp., Chicago, Ill.
Gemaco—Compressors. General Machinery Co., Spokane, Wash.
Gemco—Bolts, clamps, hangers and supports, fasteners. Goodloe E. Moore, Inc., Danville, Ill.
Gemware—Hygrometers, psychrometers, thermometers, recorders, switches. G. M. Mfg. Co., New York, N. Y.
General—Filters. General Filters, Inc., Novi, Mich.
Genetron—Refrigerants. General Chemicals Div., Allied Chemical & Dye Corp., New York, N. Y.
Genuine Stillson—Wrenches. Walworth Co., New York, N. Y.
Geometric—Chasers. Greenfield Tap & Die Corp., Greenfield, Mass.
Giant—Radiation. John J. Nesbitt, Inc., Philadelphia, Pa.
Giant—Radiator hangers. Western Hanger Co., San Francisco, Calif.
Gilbarco—Compressors, oil burners, heaters, Pumps. Gilbert & Barker Mfg. Co., West Springfield, Mass.
Gilsonite—Protective coatings. Ohmlac Paint & Refining Co., Inc., New York, N. Y.
Gilt Edge—Belting. Rhoads & Sons, J. E., Philadelphia, Pa.
Gland-Pakt—Expansion joints. Yarnall-Waring Co., Philadelphia, Pa.
Glazecoat—Building insulation. Johns-Manville, New York, N. Y.
Glo Tech—Glass pipe. Fischer & Porter Co., Hatboro, Pa.
Glowan—Gas burners. Martin Co., Inc., J. O., San Francisco, Calif.
Gloweld—Welded steel tubing. Globe Steel Tubes Co., Milwaukee, Wis.
Glucosates—Compounds, steam system treatment. Haering & Co., Inc., D. W., San Antonio, Tex.
Glycolator—Sterilizing units. Iron City Chemical Co., Valencia, Pa.
Glycolator—Sterilizing units. Pittsburgh Chemical Laboratories, Inc., Pittsburgh, Pa.
Glycosol—Sterilizing units. Pittsburgh Chemical Laboratories, Inc., Pittsburgh, Pa.
Glycosol—Sterilizing units. Iron City Chemical Co., Valencia, Pa.
Gohi—Sheets. Newport Rolling Mill Co., Newport, Ky.
Gold Bond—Insulation. National Gypsum Co., Buffalo, N. Y.
Good—Pumps. Goodfellow Co., Inc., E. D., Memphis, Tenn.
Goodyearite—Packing. Goodyear Tire & Rubber Co., Akron, O.
Gordon—Pipe and tubing benders. Pacific Machine & Iron Wks., Tacoma, Wash.
Grad-U-Motor—Damper operators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Gradustat—Regulators, thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Gradutrol—Diaphagm valves, radiator orifices. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Grand Rapids—Boiler vacuum cleaners. Doyle Vacuum Cleaner Co., Grand Rapids, Mich.
Granodine—Protective coatings. American Chemical Paint Co., Ambler, Pa.
Granodraw—Protective coatings. American Chemical Paint Co., Ambler, Pa.
Graycote—Cement and compounds. Chicago Gasket Co., Chicago, Ill.
Graylite—Insulation. Insulite Co., Minneapolis, Minn.
Greastop—Air filters. Air-Maze Corp., Cleveland, O.
Great Seal—Gaskets, packing, valves. New York Belting & Packing Co., Passaic, N. J.
Greenspot—Hose clamps. Scovill Mfg. Co., Waterville Div., Waterville, Conn.
Greyhound—Welders. Duro-Dyne Corp., Hempstead, L. I., N. Y.
Grid—Unit coolers, radiation, unit heaters, humidifiers. Murray Mfg. Co., D. J., Wausau, Wis.
Griptube—Fittings. Flodar Corp., Cleveland, O.
Gripzins—Expansion bolts. Star Expansion Bolt Co., New York, N. Y.
Gritseald—Rotary pumps. St. Louis Tool Co., St. Louis, Mo.
Gruvagrip—Couplings. Gustin-Bacon Mfg. Co., Kansas City, Mo.
Guardian—Gaskets. Garlock Packing Co., Palmyra, N. Y.
Gunchrome—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
Gundol—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
Gun Pakt—Expansion joints. Yarnall-Waring Co., Philadelphia, Pa.
Guthfan—Fans. Guth Co., Edwin F., St. Louis, Mo.
Gyrol Fluid Drive—Speed changer. American Blower Corp., Detroit, Mich.

H & C—Grilles, registers. Hart & Cooley Mfg. Co., Holland, Mich.
H-O-H—Compounds, feeders, steam system and water treatment. Haering & Co., Inc., D. W., San Antonio, Tex.
HS—Fans. American Blower Corp., Detroit.
Hallowell—Bearings. Standard Pressed Steel Co., Jenkintown, Pa.
Hammerkraft—Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.
Hammerlin—Coatings, enamels. Interchemical Corp., Newark, N. J.
Hammermill—Belting. Goodyear Tire & Rubber Co., Akron, O.
Hammer-on—Regulators. Air Control Products, Inc., Coopersville, Mich.
Hancock—Valves. Manning, Maxwell & Moore, Inc., Stratford, Conn.
Handy—Valves. Allin Mfg. Co., Chicago, Ill.
Handy—Benders. Holsclaw Bros., Inc., Evansville, Ind.
Handy—Ducts and duct fittings. Meyer & Bro. Co., F., Peoria, Ill.
Handy Andy—Vise stands. Western Wire Products Co., St. Louis, Mo.
Handy-Flux—Solder. Handy & Harman, New York, N. Y.
Hardweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Hartmann—Heaters. Montgomery Bros., San Francisco, Calif.
Hazleton—Pumps, strainers, valves. Barrett, Haentjens & Co., Hazleton, Pa.
Heath-Crete—Refractories. Quigley Co., Inc., New York, N. Y.
Heart-Oak—Belting. Graton & Knight Co., Worcester, Mass.
Heat-aid—Refractories. Pyrolite Products Co., Cleveland, O.
Heatcote—High temperature paint. Debevoise Co., The, Brooklyn, N. Y.
Heat-Crete—Concrete densifiers. Lee-Don, Inc., Pittsburgh, Pa.
Heat Extractor—Boilers. National Radiator Co., The, Johnstown, Pa.
Heat-Hog—Coolers. Heatron, Inc., York, Pa.
Heatomat—Boilers. Richmond Radiator Co., New York, N. Y.
Heat-Pak—Boilers, heaters. Aldrich Co., The, Wyoming, Ill.
Heatrim—Radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Heat-Rite—Registers. Auer Register Co., Cleveland, O.
Heatsaver—Systems. Advance Pump Co., Berkeley, Calif.
Heatsum—Conductors, cable. Roberson Co., L. N., Seattle, Wash.
Heat-Tite—Insulating cement. Ramtite Co., The, Chicago, Ill.
Heat-Valve—Ventilators. Swartwout Co., The, Cleveland, O.
Heat-X—Heat exchangers, aftercoolers, chillers, coolers, heaters, condensers. Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Heat-X-Fin—Finned surface and tubing. Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Heilex—Tanks. Heil Process Equipment Corp., Cleveland, O.
Heliarc—Welders. Linde Air Products Co., A Div. of Union Carbide & Carbon Corp., New York, N. Y.
Heliflow—Aftercoolers, chillers, oil coolers, heat exchangers, water heaters. Graham Mfg. Co., Inc., New York, N. Y.
Hellite—Refractories. Johns-Manville, New York, N. Y.
Herco—Arc welders. Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
Herculoy—Tubing. Revere Copper and Brass, Inc., New York, N. Y.
Herecrol—Protective Coatings. Heresite & Chemical Co., Manitowoc, Wis.
Hev-E-Oil—Burners. Cleaver-Brooks Co., Milwaukee, Wis.
Hex-Changer—Heat Exchangers. Drayer-Hanson, Inc., Los Angeles, Calif.
Hex-Tex—Belts. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Hi-Cap—Furnaces. Syncromatic Corp., Watertown, Wis.
Hidden Heat—Coils and panels. Hi-Flow Products, Inc., Lindenhurst, N. Y.
Hi-Duty—Tubing cutters, fittings, flaring tools. Imperial Brass Mfg. Co., Chicago.
Hi-Duty—Combustion chambers. Monogram Products Co., Inc., Philadelphia, Pa.
Hi-Ef—Filters, heads, separators. Anderson Co., V. D., The, Cleveland, O.
Hi-Ex—Roof ventilators. Penn Ventilator Co., Philadelphia, Pa.
Hi-Fin—Surfaces, tubing. Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Highflex—Belting. Goodrich Co., B. F., Akron, O.
High - Ten - 500—Solder. Industrial Service Laboratories, Milwaukee, Wis.

High Test—Water heaters. Burnam Corp., Boiler Div., Irvington, N. Y.
Hi-Heat—High temperature paint. Claronex Products, Inc., Brooklyn, N. Y.
Hilger—Chillers, unit coolers, unit air conditioners, valves. XL Refrigerating Co., Inc., Chicago, Ill.
Hi-Lift—Pumps. Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Hi-Lo—Alarms. Yarnall-Waring Co., Philadelphia, Pa.
Hi-Lo—Pumps. Yeomans Bros. Co., Melrose Park, Ill.
Hi-Lo-Graph—Recorders. Yarnall-Waring Co., Philadelphia, Pa.
Hi-Peak—Water chillers. Acme Industries, Inc., Jackson, Mich.
Hi-Seal—Cement and compounds. Greene, Tweed & Co., North Wales, Pa.
Hi-Speed—Welding and cutting apparatus. Dockson Corp., Detroit, Mich.
Hitchings—Boilers. Burnham Corp., Boiler Div., Irvington, N. Y.
Hi-Temp—Insulation. Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Hi-Temp—Insulation cement. Zonolite Co., Chicago, Ill.
Hi-Temp—Paint. Illinois Bronze Powder Co., Chicago, Ill.
Hi-Test—Boilers. Kewanee-Ross Corp., Kewanee, Ill.
Hi-Value—Adhesive tape. Johns-Manville, New York, N. Y.
Hoffman—Draft controls. Salina Metal Products Co., Salina, Kan.
Holdtite—Solder. American Brass Co., Waterbury, Conn.
Holgun—Drills. Black & Decker Mfg. Co., Towson, Md.
Hollo-Tech—Doors and panels. Technical Ply-Woods, Chicago, Ill.
Holt—Strainers, tube cleaners. Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Holtite—Bolts, screws. Continental Screw Co., New Bedford, Mass.
Holtite—Clamps. Yarnall-Waring Co., Philadelphia, Pa.
Honeycomb—Filters. Wilson & Co., Inc., Chicago, Ill.
Horton—Tanks. Chicago Bridge & Iron Co., Chicago, Ill.
Hot Boy—Unit heaters. Coroaire Heater Corp., The, Cleveland, O.
Hot Shot—Unit coolers. Drayer-Hanson, Inc., Los Angeles, Calif.
Hot Spot—Preheaters. Rempe Co., Chicago, Ill.
Hot Spot—Spot welders. Acme Electric Welder Co., Los Angeles, Calif.
Houghto-Clean—Boiler cleaning compounds. Houghton & Co., E. F.,, Philadelphia, Pa.
Hovalco—Valves. Homestead Valve Mfg. Co., Coraopolis, Pa.
Howlers—Alarms. Benjamin Electric Mfg. Co., Des Plaines, Ill.
Humiclean—Cleaning compounds, water treatment. Carolina Aniline & Extract Co., Charlotte, N. C.
Humidair—Humidifiers. Skilbeck Mfg. Co., Kenosha, Wis.
Humidigraph—Humidity recorders, indicator-controllers. Bristol Co., Waterbury, Conn.
Humidiguide—Hygrometers. Taylor Instrument Companies, Rochester, N. Y.
Humidomist—Nozzles, humidifiers. Supreme Electric Products Corp., Rochester, N. Y.
Humidostat—Humidistats. Johnson Service Co., Milwaukee, Wis.
Humiduct—Unit air conditioners. Bahnson Co., Winston-Salem, N. C.
Humid-U-Stat—Humidistats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Humi-Temps—Unit air coolers. Larkin Coils, Atlanta, Ga.
Hum-O-Zone—Room type humidifiers. Daffin Mfg. Co., Lancaster, Pa.
Humphrey—Heaters. General Gas Light Co., Kalamazoo, Mich.
Hurricane—Heaters. Zink Co., John, Tulsa, Okla.
Hydralt—Protective coatings. Flintkote Co., The, New York, N. Y.
Hydramotor—Valves. General Controls Co., Glendale, Calif. and Skokie, Ill.
Hydro—Recorders. Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Hydro-Flo—Heaters, heating systems, circulators, regulators. Bell & Gossett Co., Morton Grove, Ill.
Hydro-Foam—Dust collectors. Mahon Co., R. C., Detroit, Mich.
Hydro-Foil—Pumps. Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Hydroline—Shaft seals. Peerless Pump Div., Food Machinery and Chemical Corp., Los Angeles, Calif.
Hydro-Matic—Connectors. Mechanical Products Corp., Chicago, Ill.
Hydron—Bellows. Clifford Mfg. Co., Div. of Standard-Thomson Corp., Waltham, Mass.
Hydro-Temp—Towers. Santa Fe Tank & Tower Co. of Texas, Garland, Tex.
Hydro-Temp—Cooling towers. Acme Equipment Co., Muskogee, Okla.
Hydro Therm—Heaters, heating systems. Hook & Ackerman, Inc., New York, N. Y.
Hydro-Whirl—Dust collectors, spray booths. Peters-Dalton, Inc., Detroit, Mich.
Hydryer—Dehumidifiers. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Hy-Duty—Blower wheels, fans. Schwitzer-Cummins Co., Indianapolis, Ind.
Hy-Pro—Taps. Continental Screw Co., New Bedford, Mass.
Hyrate—Refractories. Plibrico Co., Chicago, Ill.
Hy-Spar—High temperature paint. Midland Paint & Varnish Co., Cleveland, O.
Hy-Speed—Pipe vises. Munton Mfg. Co., Franklin Park, Ill.
Hytemp—Insulation. Armstrong Cork Co., Lancaster, Pa.
Hy-Temp—Cement, insulation. Keasbey & Mattison Co., Ambler, Pa.
Hytempite—Cement, refractories. Quigley Co., Inc., New York, N. Y.
Hy-Test—Heaters. Burnham Corp., Boiler Div., Irvington, N. Y.
Hy-Test—Water heaters, Smith Co., Inc., H B The, Westfield, Mass.
Hy-Vent—Eliminators. Taco Heaters, Inc., Providence, R. I.
Hytork—Motors. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

IMO—Pumps. De Laval Steam Turbine Co., Trenton, N. J.
I-R—Ingersoll-Rand, New York, N. Y.
IVCO—Ventilators. Iona Ventilator Co., Inc., Philadelphia, Pa.
Ice-Cel—Refrigeration accumulators. Dole Refrigerating Co., Chicago, Ill.
Icy-Flo—Accumulators. McQuay, Inc., Minneapolis, Minn.
Ideal—Blowers. Perfection Grate & Stoker Co., Springfield, Mass.
Ideal—Tools. Boston Machine Works, Co., Lynn, Mass.
Ideal—Traps. Nason Co., Clarkston, Mich.
IllBronze—Paint. Illinois Bronze Powder Co., Chicago, Ill.
Immersatherm—Thermostats. Mercoid Corp., The, Chicago, Ill.
Impact—Nozzles. Phillips Cooling Tower Co., Inc., Brooklyn, N. Y.
Imperial—Air conditioning units. International Metal Products Co., Phoenix, Ariz.
Impregnated—Bases and pads. Celotex Corp., The, Chicago, Ill.
Impulse—Traps. Yarnall-Waring Co., Philadelphia, Pa.
Inco—Electrodes, flanges, pipe fittings, pipe, rod, sheets, tubing. International Nickel Co., Inc., The, New York, N. Y.
Inconel—Pipe, fittings, flanges, pipe, sheets, tubing. International Nickel Co., Inc., The, New York, N. Y.
Inconel—Tubing. Trent Tube Co., East Troy, Wis.
Indeeco—Heaters, pipe heating systems. Industrial Engineering & Equipment Co., St. Louis, Mo.
Indestructible—Fittings, gasket, pipe. New York Belting & Packing Co., Passaic, N. J.
Indoor-Outdoor—Thermostats. White-Rodgers Electric Co., St. Louis, Mo.
IngAclad—Stainless clad sheets. Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
In-Hib-Co—Protective coatings. Haering & Co., Inc., D. W., San Antonio, Tex.
Inkstop—Air filters. Air-Maze Corp., Cleveland, O.
Inseal—Piston rings. Double Seal Ring Co., Fort Worth, Tex.
Ins-Lite—Insulation. Insulation Div., Minnesota and Ontario Paper Co., Minneapolis, Minn.
Ins-lite—Insulation. Insulite Co., Minneapolis, Minn.
Instant—Heaters, preheaters. Johnson Corp., The, Three Rivers, Mich.
Instant Glo—Combustion chambers. Boston Machine Works Co., Lynn, Mass.
Instant-Hardner—Compounds. Eutectic Welding Alloys Corp., Flushing, N. Y., N. Y.
InstOmatic—Couplings. Wiggins Oil Tool Co., Inc., E. B., Los Angeles, Calif.
Insulag—Insulation. Quigley Co., Inc., New York, N. Y.
Insulbrix—Refractories. Quigley Co., Inc., New York, N. Y.
Insulfil—Insulation. Refractory & Insulation Corp., New York, N. Y.
Insulkote—Boiler and tank insulation. Johns-Manville, New York, N. Y.
Insulwool—Insulation. General Insulating Products Co., Brooklyn, N. Y.
Insutape—Pipe insulation. Union Asbestos & Rubber Co., Chicago, Ill.
Insutube—Insulation. Union Asbestos & Rubber Co., Chicago, Ill.
Integral Jet—Burners. Stout & Sons, David, St. Louis, Mo.
Intensarc—Electrodes. National Carbon Co., Div. of Union Carbide & Carbon Corp., New York, N. Y.
Inter-Matic—Time switches. International Register Co., Chicago, Ill.
International—Liquid level gages. Applied Mechanics Co., Boston, Mass.
In-Tru—Fittings. Parker Appliance Co., The, Cleveland, O.
Involute—Spray nozzles. Yarnall-Waring Co., Philadelphia, Pa.
Ionaire. Ionization apparatus. General Ozone Corp., Chicago, Ill.
Ironweld—Compounds. Sight Feed Generator Co., West Alexandria, O.
Irv-o-lite—Plastic tubing. Irvington Varnish and Insulator Div. of Minnesota Mining & Mfg. Co., Irvington, N. J.
Isolant—Vibration absorbers. Finn & Co., Inc., T. R., New York, N. Y.
Isomodes—Bases and pads, vibration isolating. M. B. Mfg. Co., The, New Haven, Conn.

J & C—Burners, fans, furnaces, heaters. Jackson & Church Co., Saginaw, Mich.
J E—Valves. Jackes-Evans Mfg. Co., St. Louis, Mo.
J F S—Speed changers. Stephens-Adamson Mfg. Co., Aurora, Ill.
J-M—Gaskets, bases and pads, cement, tape. Johns-Manville, New York, N. Y.
J M Ball—Traps. Cryer Trap & Valve Div., Encor Corp., Belleville, N. J.
J O Line—Wrenches. J O Mfg. Co., South Gate, Calif.
J-W—Combustible gas alarms, leak detectors, leak testers. Johnson & Williams Ltd., Palo Alto, Calif.
Jacobus—Valves. Majot Automatic Machine Co., Inc., East Orange, N. J.
Janitrol—Boilers, burners, heaters, furnaces, units. Surface Combustion Corp., Toledo, O.
Jarco—Unions, valves. Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Ject-O-Valve—Ventilators. Swartwout Co., Cleveland, O.
Jennings—Pumps, ejectors. Nash Engineering Co., South Norwalk, Conn.
Jetal—Protective coatings. Alrose Chemical Co., Providence, R. I.
Jetcote—Protective coatings. Watson-Standard Co., Pittsburgh, Pa.
Jetglas—Heaters. Payne Furnace Div., Affiliated Gas Equipment, Inc., Monrovia, Calif.
Jetglas—Heaters. Day & Night Div., Affiliated Gas Equipment, Inc., Monrovia, Calif.
Jet Tube—Systems. McQuay, Inc., Minneapolis, Minn.
Jetweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.
Jiffy Clips—Hangers and supports. Minerallac Electric Co., Chicago, Ill.
Jiffy—Regulators. Parker-Kalon Div., General American Transportation Corp., New York, N. Y.
Joaz—Stainless steel fittings. J O Mfg. Co., South Gate, Calif.
John Crane—Boiler tube expanders, seals, packing. Crane Packing Co., Chicago, Ill.
Joint Seal—Cement. Utility Laboratory, Inc., Brooklyn, N. Y.
Joint Seal—Cement. Armite Laboratories, Los Angeles, Calif.
Jointite—Insulation. Mundet Cork Corp., North Bergen, N. J.
Jorgensen—Pipe clamps. Adjustable Clamp Co., Chicago, Ill.
Junior—Radiation. Weil-McLain Co., Michigan City, Ind.
JusRite—Ducts and duct fittings, pipe and fittings. Corbman Bros., Inc., Philadelphia, Pa.

K—Fittings. Kuhns Brothers Co., Dayton, O.
K. A. T.—Compounds and water treatment. American K.A.T. Corp., Garwood, N. J.
K-B—Dampers, regulators. Kerentoff, G. L., Cincinnati, O.
KD-2—Cement. Green Fire Brick Co., A. P., Mexico, Mo.
K-Fin—Cooling and heating surface. Griscom-Russell Co., The, Massillon, O.
K-Louver—Sun reflecting louvers. Kawneer Co., Niles, Mich.
K and M—Controls, strainers, traps, valves. Kieley & Mueller, Inc., North Bergen, N. J.
K-Master—Filters, separators, traps, valves. Kaye & MacDonald, Inc., West Orange, N. J.
K-Shield—Boiler and pipe insulation. Robinson Industries, Coleman, Mich.
Kable Kord—Belting. New York Belting & Packing Co., Passaic, N. J.
Kane—Boilers. Mears-Kane-Ofeldt, Inc., Div. S. T. Johnson Co., Bridgeport, Pa.
Kapco—Cement, sheets and board. Keystone Asphalt Products Co., Chicago, Ill.
Karbate—Carbon pipe, heat exchangers, pumps. National Carbon Co., Div. of Union Carbide & Carbon Corp., New York, N. Y.
Kathabar—Dehumidifiers, unit air conditioners, humidifiers, air washers. Surface Combustion Corp., Toledo, O.

Kaylo—Insulation. Owens-Corning Fiberglas Corp., Toledo, O.

Kearsarge—Insulation, gaskets. Johns-Manville, New York, N. Y.

Kek—Compounds, steam and water treatments. Kenite Laboratory, Inc., Madison, N. J.

Keldur—Bases and pads. Hobsite Products Co., Harrison, N. J.

Kelvinator—Dehumidifiers. Ebco Mfg. Co., Columbus, O.

Kemtex—Water softener. MacDermid Chemical Co., Bristol, Conn.

Ken—Combustion chambers. Barclay, Inc., Robert, Chicago, Ill.

Kenbric—Soot destroyers. Kenite Laboratory, Inc., Madison, N. J.

Kennison—Nozzles. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.

Kentucky—Sheets. Newport Rolling Mill Co., Newport, Ky.

Key Graphite—Cement and compounds. Key Co., East St. Louis, Ill.

Key Abso-Lute—Cement and compounds. Key Co., East St. Louis, Ill.

KeyKast—Pipe fittings & flanges. Key Co., East St. Louis, Ill.

Keystone—Packaged steam boiler units. Erie City Iron Wks., Erie, Pa.

Keystone—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.

Key-Tite—Cement and compounds. Key Co., East St. Louis, Ill.

Kidskin—Packing. Darcoid Co., Inc., New York, N. Y.

Kil-Mos—Water treatment. Chemical Engineering Co., Dallas, Tex.

Kimsul—Insulation. Kimberly-Clark Corp., Neenah, Wis.

Kinetic—Gas burners. Webster Engineering Co., Tulsa, Okla.

King-clip—Valves. Lunkenheimer Co., Cincinnati, O.

Kleen Air—Filters. Kaye & MacDonald, Inc., West Orange, N. J.

Kleenflo—Unit air filters. Air-Maze Corp., Cleveland, O.

Kleen Tube—Heaters. Vapor Heating Corp., Chicago, Ill.

Kleervo—Protectors. Wright-Austin Co., Detroit, Mich.

Klero—Packing. Greene, Tweed & Co., North Wales, Pa.

Kling Felt—Tape. Products Research Co., Los Angeles, Calif.

Klingtite—Belting. Goodyear Tire & Rubber Co., Akron, O.

Klixon—Temperature control valves, motor controllers. Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.

Klondike—Arc welders. Fern, Ralph, Scranton, Pa.

Klosd—Motors. Sterling Electric Motors, Inc., Los Angeles, Calif.

Knight-Ware—Pipe, prefabricated ducts, valves, ventilators. Knight, Maurice A., Akron, O.

Knock-Out—Arc welders, torches, drills. Lee Co., K. O., Aberdeen, S. D.

Kno-Draft—Air diffusers. Connor Engineering Corp., New York, N. Y.

Kold Board—Insulation. Baldwin-Hill Co., Trenton, N. J.

Kontrol Master—Air valves. Kieley & Mueller, Inc., Middletown, N. Y.

Kontrol Motor—Diaphragm valves. Kieley & Mueller, Inc., North Bergen, N. J.

Kool Master—Propeller fans. Air Equipment Co., Chicago, Ill.

Kool-Shade—Solar heat resisting screens. Ingersoll Products Div., Borg-Warner Corp., Chicago, Ill.

Kopr-Kote—Cement and compounds. Jet-Lube, Inc., Los Angeles, Calif.

Korda—Gaskets. Chicago Gasket Co., Chicago, Ill.

Korda-Seal—Packing. Chicago Gasket Co., Chicago, Ill.

Korector—Draft controls. Cole-Sewell Engineering Co., St. Paul, Minn.

Korner-King—Tools. R C S Tool Sales Corp., Joliet, Ill.

Korolac—Protective coatings. Goodrich Co., B. F., Akron, O.

Koroseal—Plastic tubing, protective coatings. Goodrich Co., B. F., Akron, O.

Kromatrol—Colorimeters. Will Corp., Rochester, N. Y.

Krome Kote—Coatings. Wolfe-Kote Co., Inc., Sheboygan, Wis.

Kromik—Coatings. Sherwin-Williams Co., The, Cleveland, O.

Kromover—Compounds. All-State Welding Alloys Co., Inc., White Plains, N. Y.

Kuiene 131—Refrigerants. Eston Chemicals, Div. American Potash & Chemical Corp., Los Angeles, Calif.

Kwikflux-Solder. Special Chemicals Corp., New York, N. Y.

Kwik-way—Regulators. Hart & Cooley Mfg. Co., Holland, Mich.

Kwik-Steam—Boilers. Littleford Bros., Inc., Cincinnati, O.

Kyram—Refractories and refractory cement. Quigley Co., Inc., New York, N. Y.

L. A.—Motors. The Louis Allis Co., Milwaukee, Wis.

L & N—Indicators. Leeds & Northrup Co., Philadelphia, Pa.

La-Co—Solder and fluxes. Lake Chemical Co., Chicago, Ill.

Lagfas—Adhesives. Foster Co., Benjamin, Philadelphia, Pa.

Lamneck—Ducts and duct fittings. Clayton & Lambert Mfg. Co., Louisville, Ky.

LaMont—High temperature heating systems. The International Boiler Works Co., East Stroudsburg, Pa.

Larco—Adhesives. Western Mineral Products Co., Minneapolis, Minn.

Lawson—Wrenches. Fairmount Tool & Forging, Cleveland, O.

L-Blow—Fans, ventilators. Trade-Wind Motor fans, Inc., Los Angeles, Calif.

Leader—Stocks and dies. Oster Mfg. Co., Cleveland, O.

Leader—Unit air conditioning. Remington Air Conditioning Div., Remington Corp., Auburn, N. Y.

Leaflex—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.

Leak Lock—Cement and compounds. High-side Chemicals Co., Clifton, N. J.

Lectro-Clad—Protective coatings, fittings, pipe, sheets. Bart Mfg., Inc., Belleville, N. J.

Lectrodryer—Dehumidifiers. Pittsburgh Lectrodryer Corp., Pittsburgh, Pa.

Led-Plate—Cement and compounds. Armite Laboratories, Los Angeles, Calif.

Ledaloyl—Sleeve bearings. Johnson Bronze Co., New Castle, Pa.

Leigh—Roof ventilators. Air Control Products, Inc., Coopersville, Mich.

Lekro-Tektor—Electrolytic devices. Marlo Coil Co., St. Louis, Mo.

Lektro-Kleen—Air cleaners. Lennox Furnace Co., Marshalltown, Ia., Syracuse, N. Y. & Columbus, O.

Leraydo—Zinc sheets. Illinois Zinc Co., Chicago, Ill.

Levalarm—Alarm. Reliance Gauge Column Co., Cleveland, O.

Levelizer—Gas regulators. Mueller Furnace Co., L. J., Milwaukee, Wis.

Level-Master—Regulators. Sporlan Valve Co., St. Louis, Mo.

Levelometer—Gages, recorders. Liquidometer Corp., Long Island City, N. Y.

Levelrator—Indicators, alarms, gages, recorders, regulators, switches. Fischer & Porter Co., Hatboro, Pa.

Level-Temp—Thermostats. White-Rodgers Electric Co., St. Louis, Mo.

Level-Trol—Regulators. Fisher Governor Co., Marshalltown, Ia.

Lever-Seald—Valves. Homestead Valve Mfg. Co., Coraopolis, Pa.

Liberty—Packing. Johns-Manville, New York, N. Y.

Liberty—Ventilators, caps. Penn Ventilating Co., Philadelphia, Pa.

Life Line—Electric motors. Westinghouse Electric Corp., Pittsburgh, Pa.

Light Duty—Pulleys. Gates Rubber Co., The, Denver, Colo.

Lightening Hole—Punches. M-M-A, Inc., Lancaster, Pa.

Lightning—Cleaning compounds. Western Chemical Co., Kansas City, Mo.

Lightweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.

Lima—Stokers. Carnes, Inc., John R., Lima, O.

Limit-Load—Centrifugal fans. Buffalo Forge Co., Buffalo, N. Y.

Limitorque—Valves, valve operators. Philadelphia Gear Works, Inc., Philadelphia, Pa.

Limpet—Insulation. Keasbey & Mattison Co., Ambler, Pa.

Lincwelder—Welders. Lincoln Electric Co., The, Cleveland, O.

Line—Electric motors, speed reducers. Brown Brockmeyer Co., Inc., Dayton, O.

Lineflow—Fans. American Blower Corp., Detroit, Mich.

Line-o-flo—Air diffusers, grilles. Barber-Colman Co., Rockford, Ill.

Link-Grip—Pipe wrenches. American Machine Wks., Inc., Racine, Wis.

Lin-X—Enamels and lacquers. Acme White Lead & Color Works, Detroit, Mich.

Lincolnweld—Arc welders. Lincoln Electric Co., The, Cleveland, O.

Linovector—Heating surface. Vulcan Radiator Co., Hartford, Conn.

Lipco—Cement lined fittings and pipe. Cement Lined Pipe Co., Lynn, Mass.

Liquid Eye—Sight glasses. Allin Mfg. Co., Chicago, Ill.

Liquiflux—Welding compounds. Sight Feed Generator Co., West Alexandria, O.

Liqui-Jector—Dehumidifiers, dehydrants, dehydrators. Selas Corp. of America, Philadelphia, Pa.

Lite-Cast—Combustion chambers. Monogram Products Co., Inc., Philadelphia, Pa.

Lite-Mite—Stands, wrenches. International Forge Co., Chicago, Ill.

Lithcote—Coatings. Lithgow Corp., Chicago.

Lithoform—Protective coatings. American Chemical Paint Co., Ambler, Pa.

Little Beaver—Johnston Pump Co., Pasadena, Calif.

Little Blacksmith—Punches, shears. Kidder Mfg. Co., Inc., J. F., Burlington, Vt.

Little Giant—Sump pumps. Chicago Pump Co., Chicago, Ill.

Little Giant—Stock and dies. Greenfield Tap & Die Corp., Greenfield, Mass.

Little Giant—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.

Little Giant—Pumps. Gelber Co., Samuel S., Chicago, Ill.

Little Giant—Pipe crimper tools. Pioneer Tool Company, Racine, Wis.

Livermont—Wrenches, tools. Richmont, Inc., Monrovia, Calif.

Lloyd—Solder and fluxes. Johnson Mfg. Co., Inc., Mt. Vernon, Ia.

Loadgrip—Hangers and supports. United Industries, Madison, Wis.

Lo-Blast—Burners. Mid-Continent Metal Products Co., Chicago, Ill.

Lo-Fin—Surfaces, tubing. Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.

Lo-Veyor—Conveyor. Ajax Flexible Coupling Co., Westfield, N. Y.

Lockaire—Insulation. Plastergon Wall Board Co., Buffalo, N. Y.

Lock-o-Seal—Gaskets. Wolfe Co., Inc., The Franklin C., Culver City, Calif.

Lockseam—Pipe. Naylor Pipe Co., Chicago.

Lockseam—Tubing. Helical Tube Corporation, East Orange, N. J.

Lo-K—Insulation. Lockport Cotton Batting Co., Lockport, N. Y.

Lok-Joint—Insulation. Insulite Co., Minneapolis, Minn.

Lolag—Heaters. American Instrument Co., Inc., Silver Spring, Md.

Longlife—Coating. Flexrock Co., Philadelphia, Pa.

Longrip—Pipe extractors. Ridge Tool Co., Elyria, O.

Lookout Heggie-Simplex—Boilers, heaters. Lookout Boiler & Mfg. Co., Chattanooga.

Lord Burnham—Boilers. Burnham Corp., Boiler Div., Irvington, N. Y.

Lo-Set—Stokers. Canton Stoker Corp., Canton, O.

Louvre—Louvers and shutters. Kelvin-White Co., Boston, Mass.

Lowcost—Boilers. Murray Iron Works Co., Burlington, Ia.

Lowdensite—Insulation. Insulite Div., Minnesota and Ontario Paper Co., Minneapolis, Minn.

Lown—Machines. San Angelo Foundry & Machine Co., Mt. Vernon, Ill.

Low Pressure Drop—Strainers. Zurn Mfg. Co., J. A., Industrial Div., Erie, Pa.

Loxin—Bolts. Star Expansion Bolt Co., New York, N. Y.

Loxit—Fittings. Scovill Mfg. Co., Waterville Div., Waterville, Conn.

Loxite—Pipe covering adhesives. Firestone Industrial Products Co., Akron, O.

Luminite—Boiler cleaning compounds, steam system treatment. Warren Refining & Chemical Co., The, Cleveland, O.

Lyonore Metal—Sheets. Lyon, Conklin & Co., Inc., Baltimore, Md.

M. E.—Fans. New York Blower Co., Chicago, Ill.

M. E.—Motors. Marathon Electric Mfg. Corp., Wausau, Wis.

M. & E.—Cooling surface, tubing, unit coolers, unit heaters. Merchant & Evans Co., Philadelphia, Pa.

M & F—Rubber base enamel. American-Marietta Co., Chicago, Ill.

M & H—Sheets. Matthiessen & Hegeler Zinc Co., La Salle, Ill.

MIF—Couplings, fittings. Malleable Iron Fittings Co., Branford, Conn.

MKO—Pumps. Mears-Kane-Ofeldt, Inc., Div. S. T. Johnson Co., Philadelphia, Pa.

M & M—Alarms, cut-offs, feeders, humidifiers, indicators, operators, pumps, regulators, switches, valves. McDonnell & Miller, Inc., Chicago, Ill.

M-R-C—Ball bearings. Marlin-Rockwell Corp., Jamestown, N. Y.

M-Scope—Pipe locators, leak detectors. Fisher Research Laboratory, Inc., Palo Alto, Calif.

M & T—Welders. Metal & Thermit Corp., New York, N. Y.

M/W and A/C Airmat—Air filters. American Air Filter Co., Inc., Louisville, Ky.

M-VB—Valves. Scovill Mfg. Co., Waterville Div., Waterville, Conn.

Macheta—Fans, fan blades, ventilators. Aerovent Fan Co., Inc., Piqua, O.

Maco—Treated cloth. Menardi & Co., El Segundo, Calif.

Magic—Cement and compounds. Blue Ridge Talc Co., Inc., Henry, Va.

Magic-Aire—Fans, air conditioning units. United Electric Service Co., Wichita Falls, Tex.

Magic Carpet—Door controls. Stanley Works, The, New Britain, Conn.

Magic Dial—Pre-assembled control systems. Midwest Automatic Control Co., Des Moines, Ia.
Magic Eye Door—Door controls. Stanley Works, The, New Britain, Conn.
Magic-Grip—Sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Magic Wire—Control systems wire. Midwest Automatic Control Co., Des Moines, Ia.
Magnefer—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
Magnehelic—Portable analyzers. Dwyer Mfg. Co., F. W., Chicago, Ill.
Magnetrol—Alarms, boiler cut-offs, switches. Schaub Engineering Co., Fred H., Chicago, Ill.
Magnex—Scale removal. Magnus Chemical Co., Garwood, N. J.
Magnilastic—Pipe joints and valves. Cook Electric Co., Chicago, Ill.
Mainliner—Fan blades. Burden Co., Alan E., Los Angeles, Calif.
Make-up Air—Air conditioning units. New York Blower Co., Chicago, Ill.
Manganend—Electrodes. Arcos Corp., Philadelphia, Pa.
Manganweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Manitowoc—Water heaters, tanks. Copper Boiler & Heater Wks., Manitowoc, Wis.
Manotox—Coatings. X-Pando Corp., Long Island City, N. Y.
Manu-Rod—Pipe cleaning machines. Spartan Tool Co., Chicago, Ill.
Mar-Flex—Joints. Marquette Coppersmithing Co., Philadelphia, Pa.
Marine—Burners. Sun-Ray Burner Mfg. Corp., Jamaica, N. Y.
Mark Time—Time switches. Rhodes, Inc., M. H., Hartford, Conn.
Marocol—Compounds. O'Brien Industries, Caldwell, N. J.
Marvair—Air conditioning units. Muncie Gear Works, Muncie, Ind.
Marvellaire—Air conditioning units. Meyer Furnace Co., The, Peoria, Ill.
Marvelous—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Marvelwite—Enamels and lacquers. Sonneborn Sons, Inc., L., New York, N. Y.
Masco—Combustion chambers. Munn & Steele, Inc., South Boston, Mass.
Mascote—Insulation. Munn & Steele, Inc., South Boston, Mass.
Massachusetts—Fans, unit heaters, blower wheels, air washers, housings, ventilators. Bishop & Babcock Mfg. Co., Cleveland, O.
Master—Heating systems, valves. Radiator Valve Co. of America, Philadelphia, Pa.
Master—Fittings. Mel Products Co., The, New Haven, Conn.
Master—Stokers. Muncie Gear Wks., Inc., Muncie, Ind.
Master—Unions. Jefferson Union Co., Inc., New York, N. Y.
Master—Water heaters. Kehm Corp., The, Chicago, Ill.
Master-Bilt—Pumps. Schaub Engineering Co., Fred H., Chicago, Ill.
Master Kraft—Air heaters. Harvey-Whipple, Inc., Springfield, Mass.
Mastic—Coatings. Poe Co., C. W., The, Cleveland, O.
Maxdrill—Drills. Cummins Portable Tool Co., Chicago, Ill.
Maximon—Gages. J. E. Lonergan Co., Philadelphia, Pa.
Maxsteam—Boilers. Martin Co., Inc., J. O., San Francisco, Calif.
McDaniel—Floats, traps. Watson & McDaniel Co., Philadelphia, Pa.
McGregor—Glasses. Chesterton Co., A. W., Everett, Mass.
Measurrench—Wrenches. Williams & Co., J. H., Buffalo, N. Y.
Meco—Torches, compounds, gages, regulators, valves, welding rod. Modern Engineering Co., St. Louis, Mo.
Melloblu—Gas burners. Beck Engineering Combustion Kompany, St. Louis, Mo.
Mel Rock—Humidifiers, units, ventilators, washers. Mellish & Murray Co., Chicago, Ill.
Mercury—Pipe cutting machines. Obear & Son, W. F., Los Angeles, Calif.
Merrill Process—Heating systems. Parks-Cramer Co., Fitchburg, Mass.
Metakote—Enamels and lacquers. Tropical Paint & Oil Co., Cleveland, O.
Metal-Master—Shears. Wiss & Sons Co., J., Newark, N. J.
Metalflo—Tubes and tubing. H & H Tube & Mfg. Co., Detroit, Mich.
Metalhide—Protective coatings. Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Metalite—Enamels and lacquers. Atlas Powder Co., North Chicago, Ill.
Metalprep—Compounds. Nielson Chemical Co., Detroit, Mich.
Metaphram—Valves. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Metco—Ducts and duct fittings. Sheet Metal Mfg. Co., Inc., Brooklyn, N. Y.
Meteor—Hoists. Chisholm-Moore Hoist Div., Columbus McKinnon Chain Corp., Tonawanda, N. Y.
Metermax—Thermometers. Leeds & Northrup Co., Philadelphia, Pa.
Met-L-Flex—Bases and pads. Robinson Aviation, Inc., Vibrashock Div., Teterboro, N. J.
Metl-Tech—Doors and panels, metal sheets. Technical Ply-Woods, Chicago, Ill.
Metrotherm—Thermostats. General Controls Co., Glendale, Calif.
Micafil—Insulation. Munn and Steele, Inc., South Boston, Mass.
Mico—Insulation. Mineral Insulation Co., Chicago Ridge, Ill.
Micro—Low water cut-offs. Maid-O'-Mist, Inc., Chicago, Ill.
Microclone—Collectors. Dustex Corp., Buffalo, N. Y.
Micro-Feed—Humidifiers. Cleveland Humidifier Co., Cleveland, O.
Micr-O-Feeder—Proportioning pumps. % Proportioneers, Inc. %, Providence, R. I.
Micro-Klean—Filters. Cuno Engineering Corp., Meriden, Conn.
Microlite—Insulation. Glass Fibers, Inc., Toledo, O.
Micromax—Recorders, indicator and recorder-controllers, thermometers. Leeds & Northrup Co., Philadelphia, Pa.
Micromet—Water treatment. Calgon Inc., Pittsburgh, Pa.
Micromotors—Motors. Redmond Co., Inc., Owosso, Mich.
Micro-Netic—Feeders. Campbell Co., J. A., Long Beach, Calif.
MicroRold—Sheets. Washington Steel Corp., Washington, Pa.
Microtherm—Thermostats. Barber-Colman Co., Rockford, Ill.
Microvac—Pumps. Stokes Machine Co., F. J., Philadelphia, Pa.
Micro-Weld—Spot welders. Micro Products Co., Chicago, Ill.
Midget—Radiation. Utica Radiator Corp., Utica, N. Y.
Midget Powerhouse—Unit heaters. Century Engineering Corp., Cedar Rapids, Ia.
Midget Waterboy—Float valves. Maid-O'-Mist, Inc., Chicago, Ill.
Mighty Midget—Drills. Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.
Mighty Mite—Thermostats. Mechanical Industries Production Co., Akron, O.
Milcor—Doors and panels. Inland Steel Products Co., Milwaukee, Wis.
Milford—Tools. Thompson & Son Co., The, Henry G., New Haven, Conn.
Mills—Boilers. Smith Co., Inc., H. B., The, Westfield, Mass.
Milvaco—Air eliminators, floats, strainers, traps, valves. Milwaukee Valve Co., Milwaukee, Wis.
Mindicator—Gages. Dickson Co., The, Chicago, Ill.
Minicordes—Recorders. Dickson Co., The, Chicago, Ill.
Minneapolis—Compressors. North Penn Co., New York, N. Y.
Mipco—Valves. Marine & Industrial Products Co., Philadelphia, Pa.
Miracle—Adhesives, fasteners. Devices, Inc., New York, N. Y.
Miracle Red—Coatings. Debevoise Co., The, Brooklyn, N. Y.
Mir-O-Meter—Combustion control systems. Bowser, Inc., Fort Wayne, Ind.
Mirrolac—Enamels and lacquers. Devoe & Raynolds Co., Inc., New York, N. Y.
Mixend—Arc welding electrodes. Arcos Corp., Philadelphia, Pa.
MKAYO—Boilers. Mears-Kane-Ofeldt Inc., Div. S. T. Johnson Co., Philadelphia, Pa.
Mobilene—Gaskets. Johns-Manville, New York, N. Y.
Moderator—Heating System. Warren Webster Co., Camden, N. J.
ModernAire—Fans, unit air conditioners. National Gas Equipment Co., Inc., Terrell, Tex.
Modu-Aire—Air conditioning units. United States Air Conditioning Corp., Minneapolis, Minn.
Moduflow—Control systems. Minneapolis-Honeywell Regulator Co., Minneapolis.
Modustat—Valves. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Modutrol—Heating systems, valve and duct operators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Modutron—Regulators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mogul—Packing. Johns-Manville, New York, N. Y.
Mogul—Boiler cleaning compounds and water treatment. North American Mogul Products Co., The, Cleveland, O.
Moisture Magnet—Dehumidifiers. Remington Air Conditioning Div., Remington Corp., Auburn, N. Y.
Moldisc—Grinders and grinding wheels. Raybestos-Manhattan, Inc., Passaic, N. J.
Moncrief—Ducts and duct fittings, heaters. Henry Furnace Co., The, Medina, O.
Monel—Pipe fittings, flanges, pipe, sheets, tubing. International Nickel Co., Inc., The, New York, N. Y.
Monend—Arc welding electrodes. Arcos Corp., Philadelphia, Pa.
Mongol—Pipe joint cement and compounds. Baer Bros., New York, N. Y.
Monitor—Pumps. Baker Mfg. Co., Evansville, Wis.
Monmouth—Filters, humidifiers, valves. Cleveland Humidifier Co., Cleveland, O.
Mono-Block—Insulation. Baldwin-Hill Co., Trenton, N. J.
Monobolt—Chillers, oil coolers, water heaters. Graham Mfg. Co., Inc., New York, N. Y.
Mono-Cast—Pipe. American Cast Iron Pipe Co., Birmingham, Ala.
Monocast—Refractories and refractory cement. Ramtite Co., The, Chicago, Ill.
Monoflo—Hot water heating systems and fittings. Bell & Gossett Co., Morton Grove, Ill.
Mono-Line—Refractories. Quigley Co., Inc., New York, N. Y.
Monoloct—Heat exchangers. Graham Mfg. Co., Inc., New York, N. Y.
Monomotors—Motors. Redmond Co., Inc., Owosso, Mich.
Mono-Peen—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Monotube—Link-Belt Co., Chicago, Ill.
Monovent—Ventilators. Burt Mfg. Co., Akron.
Monsoon—Fans, grilles, louvers. Jamieson Mfg. Co., Dallas, Texas.
Morflex—Flexible couplings. Morse Chain Co., Detroit, Mich.
Morgrip—V belts. Maurey Mfg. Corp., Chicago, Ill.
Mor-Heat—Treatment to inhibit corrosion, compounds. Moreheat Distribution, Inc., Cincinnati, O.
Morlex—Steam system treatment. Carbide & Carbon Chemicals Co., A Div. of Union Carbide and Carbon Corp., New York.
Mortairset—Refractories. Walsh Refractories Corp., St. Louis, Mo.
Mortite—Gaskets. Mortell Co., J. W., Kankakee, Ill.
Moto-Merco—Relays. Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Motopump—Pumps. Yeomans Bros. Co., Melrose Park, Ill.
MotoReducer—Speed reducers. Philadelphia Gear Works, Inc., Philadelphia, Pa.
Motorstoker—Stokers. Hershey Machine & Foundry Co., Motorstoker Div., Manheim, Pa.
Motosteel—Valves. Taylor Instrument Companies, Rochester, N. Y.
Mototurb—Ventilators. Uno Ventilator Co., Malden, Mass.
Mouat—Compounds, eliminators, traps. Squires Co., C. E., The, Cleveland, O.
Mountain Air—Air conditioning units. Central States Mfg. Co., Inc., Arkansas City, Kan.
Muckle-Vent—Ventilators. Muckle Mfg. Co., Owatonna, Minn.
Muffletone—Insulation. Celotex Corp., The, Chicago, Ill.
Mullitex—Refractories. Walsh Refractories Corp., St. Louis, Mo.
Mult-Au-Matic—Threading and boring machines. Bullard Co., The, Bridgeport, Conn.
Multiblade—Welding fume exhausters. General Blower Co., Morton Grove, Ill.
Multiclone—Dust collectors. Western Precipitation Corp., Los Angeles, Calif.
Multi-Duty—Air filters. American Air Filter Co., Inc., Louisville, Ky.
Multiduty—Pulleys and sheaves. Gates Rubber Co., The, Denver, Colo.
Multi-Flex—Ducts and duct fittings. United States Rubber Co., New York, N. Y.
Multilarm—Alarms. Automatic Control Co., St. Paul, Minn.
Multiplane—Vibration isolating bases. Lord Mfg. Co., Erie, Pa.
Multi-Seal—Bolts, repair plugs. Kenney Co., L. C., Chicago, Ill.
Multitherm—Air conditioning units. Clarage Fan Co., Kalamazoo, Mich.
Multi-Tip—Gas burners. Dalzen Mfg. Co., St. Clair, Mich.
Multi-V—V-belts. Goodrich Co., B. F., Akron.
Multivane—Fans, blowers, unit heaters. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Multi-V-Drive—Drives. Worthington Corp., Harrison, N. J.
Multi-Vent—Diffusers, air diffusion panels. Multi-Vent Div., Pyle-National Co., The, Chicago, Ill.
Multi-Vise—Pipe vises. American Implement Co., Omaha, Neb.
Multi-Wash—Dust collectors. Schneible Co., Claude B., Detroit, Mich.
Murex—Welding electrodes. Metal & Thermit Corp., New York, N. Y.

NCG—Solder, torches, welding rod. National Cylinder Gas Co., Chicago, Ill.
N-M-D—Valves. Lunkenheimer Co., Cincinnati, O.
NYB Steelfin—Heating surface. New York Blower Co., Chicago, Ill.

Nalco—Solder. National Lead Co., New York, N. Y.
Nalco—Feeders, water treatment, soot destroyers. National Aluminate Corp., Chicago, Ill.
National—Ground anodes. National Carbon Co., Div. of Union Carbide & Carbon Corp., New York, N. Y.
National—Boilers, heaters. National Radiator Co., The, Johnstown, Pa.
National—Fans, furnaces, heaters. MaGirl Foundry & Furnace Co., Bloomington, Ill.
National—Heaters. Mid-Continent Metal Products Co., Chicago, Ill.
National—Pipe, tubes, tubing. National Tube Div., United States Steel Corp., Pittsburgh.
National—Pipe cutters. Wachs Co., E. H., The, Chicago, Ill.
National Art—Convection radiation, heat exchangers. National Radiator Co., The, Johnstown, Pa.
National-Champion—Furnaces, air heaters. National Heater Co., St. Paul, Minn.
Natur Temp—Insulation. Plastergon Wall Board Co., Buffalo, N. Y.
Naturzone—Insulation. Wilson & Co., Inc., Chicago, Ill.
Navalon—Fiber packing. Johns-Manville, New York, N. Y.
Nelson—Stokers, pumps, air conditioning units, ventilators. Heating Assurance, Inc., Spokane, Wash.
Nelweld—Welders. Nelson Stud Welding Div., Gregory Industries, Inc., Lorain, O.
Nemo—Insulating cement. Smith & Kanzler Corp., Linden, N. J.
Neo Coat—Coatings. Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
Nerva-Kote—Protective coatings. Rubber and Plastics Compound Co., New York, N. Y.
Nerva-Plast—Protective coatings. Rubber and Plastics Compound Co., New York, N. Y.
Nesbitt—Heaters. Webster & Co., Warren, Camden, N. J.
New Cyclone—Dust collectors. Kirk & Blum Mfg. Co., Cincinnati, O.
New Multifin—Radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Niagara—Meters. Buffalo Meter Co., Buffalo, N. Y.
Nibco—Fittings, flanges, joints, valves. Northern Indiana Brass Co., Elkhart, Ind.
Nibcoloy—Fittings, pipe, stainless steel. Northern Indiana Brass Co., Elkhart, Ind.
Nickelend—Electrodes. Arcos Corp., Philadelphia, Pa.
Nickend—Electrodes. Arcos Corp., Philadelphia, Pa.
Nicloy—Pipe, tubes, tubing. Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Nicolet—Insulation. Sall Mountain Co., Hamilton, O.
Nicuend—Electrodes. Arcos Corp., Philadelphia, Pa.
Nifer—Clad sheets. General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Nite Cool—Fans. Air Equipment Co., Chicago, Ill.
No Drip—Insulation, protective coatings. J. W. Mortell Co., Kankakee, Ill.
Nocordal—Pipe coils, refrigerating condensers, and heat exchangers. Heil Process Equipment Corp., Cleveland, O.
Non-clog—Sewage ejectors and pumps. Chicago Pump Co., Chicago, Ill.
Non-clog—Pipe line strainers. Boylston Steam Specialty Co., Chicago, Ill.
Non-Clogging—Spray nozzles. Link-Belt Co., Chicago, Ill.
Non-Con-Dux—Cement, insulation. Grant Wilson, Inc., Chicago, Ill.
Non-Frost—Insulation. Keasbey & Mattison Co., Ambler, Pa.
Nonisol—Sludge prevention treatment. Alrose Chemical Co., Providence, R. I.
Non-Sweat—Insulation. Keasbey & Mattison Co., Ambler, Pa.
No-Ox-Id—Protective coatings. Dearborn Chemical Co., Chicago, Ill.
Norblo—Dust collectors, fans. Northern Blower Co., Cleveland, O.
Nordstrom—Valves. Rockwell Mfg. Co., Meter & Valve Div., Pittsburgh, Pa.
Northwestern—Water heaters. Coe Mfg. Co., Painesville, O.
Northwind—Unit air coolers. Pleasantaire Corp., Washington, D. C.
Norwesco—Cement and compounds, boiler and radiator sealing compounds. Atlas Chemical Co., Marietta, O.
No-Spat—Welding compounds. Midland Paint & Varnish Co., Cleveland, O.
No-Thread—Fittings. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
No-Vent—Pumps. Stout & Sons, David, St. Louis, Mo.
Novoid—Insulation, adhesives, vibration isolating bases. National Cork Co., Englewood, N. J.
Nox-Odor—Odor adsorber. Tamms Industries, Inc., Chicago, Ill.
Nu-Air—Adsorbers. Aerotrol Engineering Co., Pittsburgh, Pa.
Nu-Air—Fans, window ventilator units, blades. Meier Electric & Machine Co., Inc., Indianapolis, Ind.
Nu-Alpina—Ventilators. Inland Steel Products Co., Milwaukee, Wis.
Nu-Grip—Shears and snips. Wiss and Sons Co., J., Newark, N. J.
Nullmatic—Gages, indicators, meters, recorders. Moore Products Co., The, Philadelphia, Pa.
Nu-Notch—Mushroom ventilators. Knowles Mushroom Ventilator Co., Upper Montclair, N. J.
Nu-Wood—Insulation. Wood Conversion Co., St. Paul, Minn.
Nyavco—Valves, gages. New York Air Valve Corp., Brooklyn, N. Y.
Nylined—Sleeve bearings. Thomson Industries, Inc., Manhasset, N. Y.

OB—Valves, Ohio Brass Co., Mansfield, O.
O'B-Aid—Compounds. O'Brien Industries, Caldwell, N. J.
O'B-Aige—Water treatment. O'Brien Industries, Caldwell, N. J.
O'B-Col—Compounds. O'Brien Industries, Caldwell, N. J.
O'B-Ox—Water treatment. O'Brien Industries, Caldwell, N. J.
OCH—Filters. American Air Filter Co., Louisville, Ky.
O.E.M.—Flue caps, combustion chambers, cement and compounds. Oil Equipment Mfg. Corp., New Haven, Conn.
O. X.—Punches. Parker-Kalon Div., General American Transportation Corp., New York, N. Y.
Oakwood—Leather belting and v-belts. Baldwin Belting, Inc., New York, N. Y.
Oasis—Electric dehumidifiers. Ebco Mfg. Co., Columbus, O.
O'Both—Water treatment. O'Brien Industries, Caldwell, N. J.
O'Burnit—Soot destroyers. O'Brien Industries, Caldwell, N. J.
Octopus—Welding fume exhausters. Chelsea Fan & Blower Co., Inc., Plainfield, N. J.
Oil-A-Fire—Burners. Automatic Firing Corp., St. Louis, Mo.
Oilbuster—Boiler cleaning compounds. Cannon Chemical Co., Inc., Cambridge, Mass.
Oil-O-Matic—Oil burners, heaters. Williams Div., Eureka Williams Corp., Bloomington, Ill.
Oiltex—Gaskets. Chicago Gasket Co., Chicago, Ill.
Oiltite—Cement. Utility Laboratory, Inc. Brooklyn, N. Y.
Oilway—Oil fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Okay Tred—Leather belting. Houghton & Co., E. F., Philadelphia, Pa.
Ol' Faithful—Humidifiers. Maid-O'-Mist, Inc., Chicago, Ill.
Omega—Joints. Marquette Coppersmithing Co., Philadelphia, Pa.
One Venturi—Heating systems, fittings. Taco Heaters, Inc., Providence, R. I.
Oriflex—Valves. Dunham Co., C. A., Chicago, Ill.
Ori-Flowrator—Flow measuring orifices. Fischer & Porter Co., Hatboro, Pa.
Ovaltube—Gas burners. Beck Engineering Combustion Kompany, St. Louis, Mo.
Oversize—Refrigerant dehydrators. Wabash Mfg. Co., Chicago, Ill.
Oxequip—Oxygen systems, pumps, valves. Oxygen Equipment & Service Co., Chicago, Ill.
Oxweld—Welding rod, welding and cutting apparatus. Linde Air Products Co., A Div. of Union Carbide & Carbon Corp., New York, N. Y.
Oxyarc—Welding and cutting apparatus. Arcos Corp., Philadelphia, Pa.
Oxycuttend—Electrodes. Arcos Corp., Philadelphia, Pa.
Oyltite-Stik—Cements and compounds. Lake Chemical Co., Chicago, Ill.
Ozite—Insulation. American Hair & Felt Co., Chicago, Ill.

P. B. H.—Cocks, try cocks. Paul B. Huyette Co., Inc., Philadelphia, Pa.
P-D—Fittings. Sullivan Valve & Engineering Co., Butte, Mont.
P-D—Pumps. Peters-Dalton, Inc., Detroit, Mich.
PD—Blowers, dust collectors, stacks and chimneys, fans. Prat-Daniel Corp., East Port Chester, Conn.
PD QC—Pipe machines. Bignall & Keeler Div., John Ramming Machine Co., St. Louis, Mo.
P & H—Blue print machines. Peck & Harvey, Chicago, Ill.
P & H—Welding electrodes, arc welders. Harnischfeger Corp., Milwaukee, Wis.
P. I. V. Gear—Speed changers. Link-Belt Co., Philadelphia, Pa.
Pacemakers—Coolers. McQuay, Inc., Minneapolis, Minn.
Pacific—Unit Heaters. Palmer Mfg. Corp., Phoenix, Ariz.
Pacific—Furnaces. Rosebraugh Co., W. W., Salem, Ore.
Pacific Coast—Refrigerant dehydrators. Wabash Mfg. Co., Chicago, Ill.
Paco—Pumps. Pacific Pumping Co., Oakland, Calif.
PAINTGRIP—Sheets. Armco Steel Corp., Middletown, O.
Paladin—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Palco—Packing. Greene, Tweed & Co., North Wales, Pa.
Palco Wool-Saferized—Insulation. Pacific Lumber Co., The, San Francisco, Calif.
Palmaire—Furnaces, unit heaters, humidifiers. Palmer Mfg. Corp., Phoenix, Ariz.
Palmetto—Packing, Greene, Tweed & Co., North Wales, Pa.
Palmetto SuperSheat—Gaskets. Greene, Tweed & Co., North Wales, Pa.
Panelair—Heaters. Payne Furnace Div., Affiliated Gas Equipment Inc., Monrovia, Calif.
Panelray—Gas fired suspended heaters. Day & Night Div., Affiliated Gas Equipment, Inc., Monrovia, Calif.
Paneltrol—Valves. Taco Heaters, Inc., Providence, R. I.
Pan-L-Grid—Coils and panels. Pan-L-Heat Corp., Portland, Ore.
Papoose—Machines. Capewell Mfg. Co., Hartford, Conn.
Par—Air compressors. Lynch Corp., Anderson, Ind.
Paracoil—Coils, condensers, heaters, oil coolers, pipe nipples, preheaters, steam traps, water chillers, aftercoolers, heating units, valves, vaporizers. Davis Engineering Corp., Elizabeth, N. J.
Paraline—Motor bases. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Parasol—Spray nozzles. Spraying Systems Co., Bellwood, Ill.
Pathfinder—Belting. Goodyear Tire & Rubber Co., Akron, O.
Pedrifugal—Centrifugal pumps. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Pee Gee—Enamels and lacquers. Devoe & Raynolds Co., Inc., New York, N. Y.
Peerless—Pipe machines. Bignall & Keeler Div., John Ramming Machine Co., St. Louis, Mo.
Peerless—Direct radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Peerless—Industrial stokers. Eddy Stoker Corp., Chicago, Ill.
Pelro—Asbestos packing. Greene, Tweed & Co., North Wales, Pa.
Penco—Plastic fittings, pipe. North Penn Co., New York, N. Y.
Penflex-Weld—Absorbers. Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.
Pennco—Sectional cast iron boilers. Pennsylvania Furnace & Iron Co., Warren, Pa.
Penn-M-Co—Fittings. Penn Mfg. Corp., of Washington, Pa., Washington, Pa.
Pennpaint—Coatings. Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
Penn-Power—Ventilators. Penn Ventilating Co., Philadelphia, Pa.
Penn-Turbine—Ventilators. Penn Ventilating Co., Philadelphia, Pa.
Pennsalt—Cleaning compounds. Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
Perfectaire—Heaters, furnaces, air conditioning units. Air Conditioning Engineering Co., Cambridge, Mass.
Perfection—Plates. Beaton & Cadwell Mfg. Co., New Britain, Conn.
Perfecto—Boiler parts, cement. Green Fire Brick Co., Mexico, Mo.
Perma-Fan—Condensers. Drayer-Hanson, Inc., Los Angeles, Calif.
Permadine—Protective coatings. American Chemical Paint Co., Ambler, Pa.
Permagran—Dehydrators. McIntire Co., The, Livingston, N. J.
Permanite—Plastic Pipe. Knight, Maurice A., Akron, O.
Permaseal—Gaskets. Chicago Gasket Co., Chicago, Ill.
Pero-Kote—Coatings. Perolin Co., The, Chicago, Ill.
Pero-Nite—Soot destroyers. Perolin Co., Inc., Chicago, Ill.
Peteco—Insulating cement, chambers. Peterson Co., B. A., Dowagiac, Mich.
Pexto—Brakes, punches, shears, wrenches, machines. Peck, Stow & Wilcox Co., Southington, Conn.
Phenolex—High temperature paint. Claronex Products, Inc., Brooklyn, N. Y.
Pic—Malleable unions. Dart Union Co., Providence, R. I.
Pic—Steel unions. Fairbanks Co., The, New York, N. Y.
Pier—Spot welders. Peer, Inc., Benton Harbor, Mich.
Pilotstat—Flame failure controls. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Pioneer—Thermostats. Crown Controls Co., Inc., New Bremen, O.
Pipe Line—Strainers. Anderson Co., V. D.,

The, Cleveland, O.
Pipe Master—Pipe wrenches. Erie Tool Wks., Erie, Pa.
Pipeasy—Pipe Cement. Flexrock Co., Philadelphia, Pa.
Pipe Master—Pipe cutting machines. Oster Mfg. Co., Cleveland, O.
Pipemaster—Wrenches. Erie Tool Wks., Erie, Pa.
Pipetite-Stik—Cements and compounds. Lake Chemical Co., Chicago, Ill.
Pistonair—Motors. Joy Mfg. Co., Pittsburgh, Pa.
Pitchlign—Roller bearings. Roller Bearing Co., of America, West Trenton, N. J.
Pittairaide—Air sterilizing units. Pittsburgh Chemical Laboratories, Inc., Pittsburgh, Pa.
Pittsburgh—Unit heaters. Automatic Gas Equipment Co., Pittsburgh, Pa.
Pittsburgh-National—Meters. Rockwell Mfg. Co., Meter & Valve Div., Pittsburgh, Pa.
Planeweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.
Plasgon—Cement and compounds. Samuel Cabot, Inc., Boston, Mass.
Plastic Gasket—Pipe cement. Flexrock Co., Philadelphia, Pa.
Plasticork—Insulation. Armstrong Cork Co., Lancaster, Pa.
Plasticote—Electric wire. Chester Cable Corp., Chester, N. Y.
Plastoid—Furnace cement. Plastic Products Co., Detroit, Mich.
Platecoil—Coils. Tranter Mfg., Inc., Lansing, Mich.
Playford—Stokers. Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Plexifin—Unit heaters. Bayley Blower Co., Milwaukee, Wis.
Plexiform—Fans. Bayley Blower Co., Milwaukee Wis.
Plicast—Refractories. Plibrico Co., Chicago, Ill.
Pliogard—Protective coatings. Saran Lined Pipe Co., Ferndale, Mich.
Pliojet—Jets for smoke abatement. Plibrico Co., Chicago, Ill.
Pliotron—Filters. Goodyear Tire & Rubber Co., Akron, Ohio.
Plisulate—Insulating cement and insulation. Plibrico Co., Chicago.
Plumber Krak-Stik—Cement and compounds. Lake Chemical Co., Chicago, Ill.
Plumrite—Pipe. Bridgeport Brass Co., Bridgeport Conn
Pluralloy—Electrodes. McKay Co., Pittsburgh, Pa.
Plymouth—Stokers. Clizbe Bros. Mfg. Co., Plymouth, Ind.
Plymouth—Stokers. Plymouth Industries, Inc., Plymouth, Ind.
Ply-Tech—Plywood sheets and board. Technical Ply-Woods, Chicago, Ill.
Pneumastat—Aftercoolers. Schramm, Inc., West Chester, Pa.
Pneumatractor—Aftercoolers. Schramm, Inc., West Chester, Pa.
Pneumatronic—Electronic and pneumatic temperature control equipment. Johnson Service Co., Milwaukee, Wis.
Pneu-Pump—Pumps. Yeomans Bros. Co., Melrose Park, Ill.
Poeco—Insulation, coatings. Poe Co., C. W., Cleveland, O.
Polartron—Relays, regulators, switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Pollenex—Humidifiers. Associated Mills, Chicago, Ill.
Polymerin—Protective coatings. Interchemical Corp., Finishes Div., Newark, N. J.
Polymeroid—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Polyprene—Protective coatings, enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Polytherm—Protective coatings, enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Pony—Pipe clamps. Adjustable Clamp Co., Chicago, Ill.
Poronze—Filters. Wabash Mfg. Co., Chicago.
Poro-Stone—Filters. Adams Co., Inc., R. P., Buffalo, N. Y.
Porta-Heet—Heaters. Auburn Burner Co., Auburn, Ind.
Port-A-Pony—Pipe cutting machines. Thread Ezy Mfg. Co., Corunna, Mich.
Porta Drive—Pipe cutting machines. Muncie Gear Wks., Inc., Muncie, Ind.
Porto-Power—Pipe benders and pipe pushers, pumps, punches. Blackhawk Mfg. Co., Milwaukee, Wis.
Porto Shears—Shears. Black & Decker Mfg. Co., Towson, Md.
Portovent—Hose. Flexaust Co., New York, N. Y.
Posit-Aire—Roof ventilators. Tripar Products, Inc., Royal Oak, Mich.
Positive Arc—Arc welders. Welding Apparatus Co., Chicago, Ill.
POWair Saver—Propeller fans. Pritchard & Co., J. F., Equipment Div., Kansas City.
Poweraire—Furnaces. Jackson & Church Co., Saginaw, Mich.
Powerated—Furnaces. Jackson & Church Co., Saginaw, Mich.
Power—Belting. Rhoads & Sons, J. E., Philadelphia, Pa.
Power Gems—Boilers. Edge Moor Iron Works, Inc., Edge Moor, Del.
Power-Flame—Leak detectors. Justrite Mfg. Co., Chicago, Ill.
Power-Flow—Ventilators. DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Power House—Sump pumps. Weil Pump Co., Chicago, Ill.
Powermaster—Boilers. Orr & Sembower, Inc., Reading, Pa.
Poweroil—Oil burners. Jackson & Church Co., Saginaw, Mich.
Power-Poise—Electric motors. Brown-Brockmeyer Co., Inc., Dayton, O.
Prasco—Insulation. Pabco Products Inc., San Francisco, Calif.
Pratt & Cady—Valves. R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Precipitron—Air cleaners. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Precision—Nozzles. Benjamin Air Rifle Co., St. Louis, Mo.
Precision Molded—Insulation. Pabco Products Inc., San Francisco, Calif.
Premier—Welding rod. American Steel & Wire Div., United States Steel, Cleveland, O.
Pre-Notch—Ducts and duct fittings. Gray Metal Products, Inc., Rochester, N. Y.
Pressuregraph—Gages. Electro Products Laboratories, Inc., Chicago, Ill.
Pressure-Link—Gages. J. E. Lonergan Co., Philadephia, Pa.
Pressure-Speed—Parts for heating and air conditioning equipment. Refrigeration Devices Co., Nutley, N. J.
Pressuretrol—Regulators, switches. Minneapolis-Honeywell Regulator Co., Minneapolis.
Prestal—Pipe and tube benders. Tal Bender, Inc., Milwaukee, Wis.
Prest-O-Lite—Leak detectors, torches. Linde Air Products Co., A Div. of Union Carbide & Carbon Corp., New York, N. Y.
Presto-Lock—Couplings. Drinkwater, Inc., Waukegan, Ill.
Presto-Lock—Couplings. Smith Bros. Co., Oak Park, Ill.
Prest-O-Weld—Welding and cutting apparatus. Linde Air Products Co., A Div. of Union Carbide & Carbon Corp., New York.
Princo—Gages, manometers, psychrometers, regulators, relays, thermometers, thermostats. Precision Thermometer and Instrument Co., Philadelphia, Pa.
Propeloflo—Meters. Builders - Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Prop-R-Temp.—Air conditioning units. Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
Protectoglo—Controls. Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Protectomotor—Air filters, separators. Dollinger Corp., Rochester, N. Y.
Protector—Lamps. M-M-A, Inc., Lancaster, Pa.
Protect-O-Ray—Lamps. Lustra Corp. of America, Brooklyn, N. Y.
Protectorelay—Flame failure controls, relays. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Proxlin—Enamels and lacquers. Acme White Lead & Color Works, Detroit, Mich.
Pryzoak—Belting. Graton & Knight Co., Worcester, Mass.
Puffglass—Filters. Drico Industrial Corp., New York, N. Y.
Pul-Air—Ventilators. Lyon, Conklin & Co., Inc., Baltimore, Md.
Pul Air—Ventilators. Penn Ventilating Co., Philadelphia, Pa.
Pulsorb—Gages. Lonergan Co., J. E., Philadelphia, Pa.
Pulling—Circulators, pumps. Columbus Steam Pump Works Co., Columbus, O.
Pulverzone—Stokers. American Coal Burner and Wood Stoker Corp., Chicago, Ill.
Puridryer—Dehumidifiers. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Pur-O-Fiers—Filters, separators. Air Conversion Research Corp., Chicago, Ill.
Pur-O-Cel—Water filters. % Proportioneers, Inc. %, Providence, R. I.
Purox—Welding and cutting apparatus. Linde Air Products Co., A Div. of Union Carbide & Carbon Corp., New York, N. Y.
Pylets—Switches, pilot and signal lights. Pyle-National Co., The, Chicago, Ill.
Pyratherm—Controls. Mercoid Corp., The, Chicago, Ill.
Pyrex—Glass pipe, heat exchangers, gage and sight glasses, valves, coils. Corning Glass Wks., Corning, N. Y.
Pyro—Thermometers, recorders, regulators. Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
Pyrofax—Propane gas refrigerant. Carbide and Carbon Chemicals Corp., New York.
Pyroflex—Coatings, lined pipes, tanks, enamels and lacquers. Knight, Maurice A., Akron.
Pyromaster—Regulators. Bristol Co., The, Waterbury, Conn.
Pyrotrol—Flame failure controls. Bristol Co., The, Waterbury, Conn.
Pyrotron—Recorders. Bailey Meter Co., Cleveland, O.
Pyrovisor—Controls. Bristol Co., The, Waterbury, Conn.

QD—Pulleys and sheaves. Worthington Corp., Harrison, N. J.
Q S—Circulators and fittings for hot water heating systems, relief valves. Quality Specialty Co., Inc., Camden, N. J.
Q-T—Insulation. Celotex Corp., The, Chicago, Ill.
Q-Chromastic—Refractories. Quigley Co., Inc., New York, N. Y.
Q-Chrome—Refractories. Quigley Co., Inc. New York, N. Y.
Q-Scal-Damit—Boiler sealing compounds. Quigley Co., Inc., New York, N. Y.
Quad—Fans. Trade-Wind Motorfans, Inc. Los Angeles, Calif.
Quantrol—Vanes. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Quartzoid—Sprinkler heads. Grinnell Co., Inc., Providence, R. I.
Quick-as-Wink—Valves. C. B. Hunt & Son, Inc., Salem, O.
Quiet Kool—Cooling units. Quiet-Heet Mfg. Corp., Newark, N. J.
Quik-Label—Identification markers. Brady Co., W. H., Milwaukee, Wis.
Quik-Mask—Gaskets. Brady Co., W. H., Milwaukee, Wis.
Quik-Temp—Steam traps. Schaub Engineering Co., Fred H., Chicago, Ill.
Quikupl—Couplings. Cooper Alloy Foundry Co., The, Hillside, N. J.
Quikupl—Pipe fittings. Frasse & Co., Peter A., New York, N. Y.
Quintair—Heat exchangers. Pritchard & Co., J. F., Kansas City, Mo.
Quintex—Heat exchangers. Pritchard & Co., J. F., Kansas City, Mo.
Quintube—Heat exchangers. Pritchard & Co., J. F., Kansas City, Mo.

RBC—Roller bearings. Roller Bearing Co. of America, West Trenton, N. J.
RB Pressure—Pressure blowers. Western Blower Co., Seattle, Wash.
R. D.—Valves. Grinnell Co., Inc., Providence, R. I.
R & G—Grilles, registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
RH—Air conditioning units. McQuay, Inc., Minneapolis, Minn.
R. I.—Unions. Rhode Island Fittings Co., Providence, R. I.
R-K—Combustion control systems, regulators, valves. Ruggles-Klingemann Mfg. Co., Boston, Mass.
R & M All-Weather—Motors. Robbins & Myers, Inc., Springfield, O.
R-M—Packing. Raybestos-Manhattan, Inc., Passaic, N. J.
R. M. B.—Ball bearings. Landis & Gyr, Inc., New York, N. Y
R & M Moyno—Pumps. Robbins & Myers, Inc, Springfield, O.
R-Mir-Dek—Protective coatings. Miracle Adhesives Corp., New York, N. Y.
RP—Air filters, water softeners. Research Products Corp., Madison, Wis.
R P M—Sheet metal. Robertson Co., H. H., Pittsburgh, Pa.
RTC—Valves. Sullivan Valve & Engineering Co., Butte, Mont.
R-U-F—Fans. Reed Unit-Fans, Inc., New Orleans, La.
R-Z-U Junior—Fire tube boilers. Fitzgibbons Boiler Co., Inc., New York, N. Y.
Rad Coil—Coils. T & H Engineering Co., Little Ferry, N. J.
Radiafin—Finned tubing, finned surface. Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Radiantweld—Tubing. Avon Tube Div., Higbe Mfg. Co., Rochester, Mich.
Radioflow—Valves. Smolensky Valve Co., Inc., Bedford, O.
Radiant—Direct radiation. Burnham Corp., Boiler Div., Irvington, N. Y.
Radiantrim—Radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Radiantrol—Valves. Homestead Valve Mfg. Co., Coraopolis, Pa.
Radi-Aire—Propeller fans. Reynolds Electric Co., River Grove, Ill.
Radi-Ion—Ionization apparatus. Montgomery Bros., San Francisco, Calif.
Radi - Vector—Radiation. Vulcan Radiator Co., Hartford, Conn.
Radolite—Cement, refractories. Pyrolite Products Co., Cleveland, O.
Rador—Thermostats. Vapor Heating Corp.,

Chicago, Ill.

Rajah—Packing. Johns-Manville, New York, N. Y.

Ramapo—Leather belting and v-belts. Baldwin Belting, Inc., New York, N. Y.

Ramset—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.

Ranarex—Analyzers, indicators, recorders. Permutit Co., New York, N. Y.

Rapid—Oil coolers. Bell & Gossett Co., Morton Grove, Ill.

Rapidayton—Units. Dayton Pump & Mfg. Co., Dayton, O.

Rapiduction—Pipe cutting machines. Oster Mfg. Co., Cleveland, O.

Ratochlor—Steam and water treatments. Fischer & Porter Co., Hatboro, Pa.

Ratogate—Valves. Fischer & Porter Co., Hatboro, Pa.

Ratosight—Alarms, flow switches. Fischer & Porter Co., Hatboro, Pa.

Ratovane—Valves. Fischer & Porter Co., Hatboro, Pa.

Raychronix—Leak detectors. Radioactive Products, Inc., Detroit, Mich.

Raydiant—Radiation. Weil - McLain Co., Michigan City, Ind.

Rayduct—Pipe. Bethlehem Steel Co., Bethlehem, Pa.

Raymaster—Refrigerant leak detectors. George W. Gates & Co., Inc., Franklin Sq., L. I., N. Y.

Reading—Fittings, valves. R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.

Ready-Pack—Clamps. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.

Recirculair—Unit heaters. New York Blower Co., Chicago, Ill.

Reco—Steam convertors, heat exchangers, headers, heaters, preheaters, tanks, unit coolers. Richmond Engineering Co., Richmond, Va.

Reco—Controllers and starters, motors, propeller fans, switches. Reynolds Electric Co., River Grove, Ill.

Recold—Refrigerating evaporative condensers, coolers, cooling & heating surface, cooling towers, air conditioning units. Refrigeration Engineering, Inc., Los Angeles, Calif.

Reco—Radi-Aire—Fans. Reynolds Electric Co., Chicago, Ill.

Record-O-Stat—Recorder-controllers. Johnson Service Co., Milwaukee, Wis.

Recoy—Chillers, condensers, cooling surface, unit air conditioners and coolers. Refrigeration Economics Co., Inc., Canton, O.

Red—Compressors, controllers and starters, heaters, indicators. operators, regulators, switches, thermostats. Cooper Co., Clark, Palmyra, N. J.

Red Cap—Ventilators, Warner Ventilator Co., La Grange, Ind.

Red Devil—Furnace and pipe joint cement. Pecora Paint Co., Philadelphia, Pa.

Red Flash—Traps. Ellis Drier Co., Chicago, Ill.

Red Head—Tongs. Billings & Spencer Co., Hartford, Conn.

Red Head—Traps. Ellis Drier Co., Chicago, Ill.

Redi-Bends—Coils. Capitol Mfg. & Supply Co., Columbus, O.

Redi—Stokers. General Machinery Co., Spokane, Wash.

Redi-Return—Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.

Red Seal—Gaskets. Chicago Gasket Co., Chicago, Ill.

Redi-Vac—Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.

Red-Reading-Mercury—Hygrometers, psychrometers, thermometers. Palmer Thermometers, Inc., Cincinnati, O.

Red Seal—Engines. Continental Motors Corp., Muskegon, Mich.

Red Socket—Wrenches. Lowell Wrench Co., Worcester, Mass.

Red Top—Humidistats, thermostats. H-B Instrument Co., Philadelphia, Pa.

Red Top—Insulation. United States Gypsum Co., Chicago, Ill.

Red Top—Concrete inserts. Leibfried Mfg. Corp., C. H., Brooklyn, N. Y.

Redycote—Coatings. Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga.

Reformend—Electrodes. Arcos Corp., Philadelphia, Pa.

Refrak Screen—Gas burners. Selas Corp. of America, Philadelphia, Pa.

Refrigerated Kooler-Aire—Air conditioning units. United States Air Conditioning Corp., Minneapolis, Minn.

Rego—Regulators, valves, welding and cutting apparatus. National Cylinder Gas Co., Chicago, Ill.

Reiser—Valves. Homestead Valve Mfg. Co Coraopolis, Pa.

Relatrol—Heating systems. Automatic Temperature Control Co., Inc., Philadelphia, Pa.

Reliance—Regulators. American Meter Co., Inc., Philadelphia, Pa.

Remotaire—Air conditioning units. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Remote—Indicators. Yarnall - Waring Co. Philadelphia, Pa.

Renewo—Valves. Lunkenheimer Co., Cincinnati, O.

Renu-Glas—Air filters. American Air Filter Co., Inc., Louisville, Ky.

Research—Belting. Graton & Knight Co., Worcester, Mass.

Resiscote—Enamels and lacquers. Reilly Tar & Chemical Corp., Indianapolis, Ind.

Reliance—Leather belting. Chicago Belting Co., Chicago, Ill.

Resistive—Insulation. Infra Insulation, Inc., New York, N. Y.

Revolute—Blueprint machines. Paragon-Revolute Corp., Rochester, N. Y.

Revolving—Heaters. Wing Mfg. Co., L. J., New York, N. Y.

Revolving—Ventilators. Burt Mfg. Co., Akron, O.

Rex—Chain drives, coal and ash conveyors, couplings, nozzles, bearings, pumps. Chain Belt Co., Milwaukee, Wis.

Rex—Fans, ventilators, wheels. Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.

Rexarc—Electrodes. Sight Feed Generator Co., West Alexandria, O.

Rex-Flex—Hose. Flexonics Corp., Maywood, Ill.

Rexoil—Burners, heaters. Reif-Rexoil, Inc., Buffalo, N. Y.

Rex-Tube—Duct connections, duct fittings, hose. Flexonics Corp., Maywood, Ill.

Rexvane—Fans. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

Rex-Weld—Hose. Flexonics Corp., Maywood, Ill.

Rezistal—Sheets. Crucible Steel Co. of America, Pittsburgh, Pa.

Rhinamel—Enamels and lacquers. Tropical Paint & Oil Co., Cleveland, O.

Ridgevent—Roof ventilators. Octagon Ventilator Co., Chicago, Ill.

Ridgid—Pipe machines, wrenches, cutters, chasers, reamers, vises. Ridge Tool Co., Elyria, O.

Ridgoil—Oil. Ridge Tool Co., Elyria, O.

Rid-Sludge—Cleaning compounds, corrosion treatment. Apex All Weather Products, Chicago, Ill.

Rifco—Unions. Rhode Island Fittings Co., Hillsgrove, R. I.

Riflex—Vibration absorbers. United Metal Hose Co., Inc., Long Island City, N. Y.

Rigidon—Pipe. Heil Process Equipment Corp., Cleveland, O.

Rigid-Tex—Metals. Rigidized Metals Corp., Buffalo, N. Y.

Rihco—Humidifiers. Rhode Island Humidifier & Ventilating Co., Boston, Mass.

Rincontrol—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.

Rip-pl—Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.

Ripple-Fin—Cooling and heating surface. McQuay, Inc., Minneapolis, Minn.

Risselt—Air valves, air eliminators. Moreheat Distribution, Inc., Cincinnati, O.

Robot—Switches, thermostats. Miller-Harris Instrument Co., Milwaukee, Wis.

Robot-Eye—Regulators, smoke alarms. General Power Plant Corp., Ossining, N. Y.

Rocop—Heaters. Rome-Turney Radiator Co., Rome, N. Y.

Rodpax—Packing. National Engineering Products, Inc., Washington, D. C.

Ro-Fin—Tubing. Rome-Turney Radiator Co., Rome, N. Y.

Ro-Flo—Compressors, pumps. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Rolagrip—Couplings. Gustin-Bacon Mfg. Co., Kansas City, Mo.

Rol-Air—Tools. Imperial Brass Mfg. Co., Chicago, Ill.

Roll-a-Bend—Pipe benders. Radiant Devices, St. Louis, Mo.

Rollway—Pumps. Pioneer Pump & Mfg. Co., Detroit, Mich.

Roofvane—Ventilators. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

Roomaster—Units. Ajax Corp. of America, Evansville, Ind.

Ross—Pipe joints. Webster & Co., Warren. Camden, N. J.

Rosslyn Metal—Sheets. American Cladmetals Co., Carnegie, Pa.

Rotameter—Flow meters. Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.

Rotary Valvent—Ventilators. Swartwout Co., The, Cleveland, O.

Roto Blast—Furnaces. Moncrief Furnace Co., Atlanta, Ga.

Roto-Clone—Dust collectors. American Air Filter Co., Inc., Louisville, Ky

Roto-Cup—Gas and oil burners. Best Combustion Equipment Co., Inc., W. N., Carlstadt, N. J.

Rotojet—Spray nozzles. Binks Mfg. Co., Chicago, Ill.

Roto-louvre—Dryers. Link-Belt Co., Chicago, Ill.

Rotomet—Solder and fluxes. Rotometals, San Francisco, Calif.

Rotometric—Solder and fluxes. Rotometals, San Francisco, Calif.

Rotonetic—Gas burners. Webster Engineering Co., Tulsa, Okla.

Roto-Torq—Tools. Richmont, Inc., Monrovia, Calif.

Roto-trol—Liquid pressure regulators, indicators, and switches. Healy Ruff Co., St. Paul, Minn.

Rotre—Vacuum pumps. Wheeler Mfg. Co., C. H., Philadelphia, Pa.

Ro-Twin—Air compressors, pumps. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Royal—Packing. United States Rubber Co., New York, N. Y.

Roxaprene—Protective coatings, enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.

Roxite—Pipe. United States Stoneware Co., New York, N. Y.

Roxyn C—Enamels and lacquers, protective coatings. Interchemical Corp., Finishes Div., Newark, N. J.

Royal—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.

Royal Clipper—Cutters and shears. M-M-A, Inc., Lancaster, Pa.

Rubalt—Enamels and lacquers, protective coating. Hague & Co., Alfred, Brookyn, N. Y.

Rubatex—Insulation. Virginia Rubatex Div., Great American Industries, Inc., Bedford, Va.

Rubyfluid—Solder. Ruby Chemical Co., Columbus, O.

Rusco—Insulation. Russell Co., F. C., The, Cleveland, O.

Rusco Thermoseal—Windows. Russell Co., F. C., The, Cleveland, O.

Rust Bloc No. 20—Coatings. Turco Products, Inc., Los Angeles, Calif.

Rustbuster—Cleaning compounds. Cannon Chemical Co., Inc., Cambridge, Mass.

Rustgon—Compounds. Turco Products, Inc., Los Angeles, Calif.

Rust Evade—Coatings. Turco Products, Inc., Los Angeles, Calif.

Rust Raider—Compounds. Radiator Specialty Co., Charlotte, N. C.

Rust Veto—Protective Coatings. E. F. Houghton & Co., Philadelphia, Pa.

S-A—Conveyors, feeders. Stephens-Adamson Mfg. Co., Aurora, Ill.

SA—Valves. Lunkenheimer Co., Cincinnati, O.

S. C.—Air heaters, gas burners, recorders. Surface Combustion Corp., Toledo, O.

S.F.E.—Insulation. Standard Fuel Engineering Co., Detroit, Mich.

S-N—Air conditioning units, burners, fans, heaters, pumps, stokers. Scott-Newcomb, Inc., St. Louis, Mo.

S O H—Boilers. Titusville Iron Wks., Co., The, Titusville, Pa.

S & P—Burners, governors, preheaters, regulators, strainers, fuel oil units, valves. Staples & Pfeiffer, San Francisco, Calif.

S. R. P.—Protective coatings. Sonneborn Sons, Inc., L., New York, N. Y.

SS Unit—Pumps. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Sanbanol—Fuel oil treatment. American Sand-Banum Co., Inc., New York, N. Y.

Saco—Speed reducers. Stephens - Adamson Mfg. Co., Aurora, Ill.

Saf - Dry—Refrigerants. Liquid Carbonic Corp., The, Chicago, Ill.

Safe-Flo—Heaters. Screw Machine Products Co., Portland, Ore.

Safe-T-Aire—Air sterilizing units. Hanovia Chemical & Mfg. Co., Newark, N. J.

Safe Guard—Fuel oil preheaters. Alstrom Corp., Bronx, N. Y.

Safety—Heaters. Wing Mfg. Co., L. J., New York, N. Y.

Safety-Circle—Motors. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Saftrol—Controls. Penn Controls, Inc., Goshen, Ind.

Sahara—Dehydrators. Imperial Brass Mfg. Co., Chicago, Ill.

Sahara—Dehumidifiers. Niagara Industrial Corp., New York, N. Y.

Saint Louis—Stokers. Ormsby-Osterman, Inc., St. Louis, Mo.

Sairset—Cement. Green Fire Brick Co., Mexico, Mo.

Sal-Mo—Cement, insulation, packing, connections, ducts, sheets and board. Sall Mountain Co., Hamilton, O.

Sanidaire—Humidifiers. United States Air Conditioning Corp., Minneapolis, Minn.

Sanimaster—Heaters. Ruud Mfg. Co., Pittsburgh, Pa.

Sanitizer—Treatment. Oakite Products, Inc., New York, N. Y.

Santobrite—Water treatment. Monsanto Chemical Co., St. Louis, Mo.

Santocel—Insulation. Monsanto Chemical Co., Merimac Div., Boston, Mass.

Santosite—Water treatment. Monsanto Chem-

ical Co., St. Louis, Mo.
Santrol—Registers. Tuttle & Bailey, Inc., New Britain, Conn.
Sarancote—Protective coatings. Saran Lined Pipe Co., Ferndale, Mich.
Satincote—Insulation, building. Insulite Div., Minnesota and Ontario Paper Co., Minneapolis, Minn.
Saunders—Pipe cutters. Erie Tool Works, Erie, Pa.
Saunders—Diaphragm valves. Grinnell Co., Inc., Providence, R. I.
Scaico—Thermostats. Smith Control & Instrument Corp., Palmyra, N. J.
Scentinel—Compounds. Ampion Corp., Long Island City, N. Y.
Schmidt—Torches. Minn-Kota Foundry & Mfg. Co., Fargo, N. D.
Schramminc—Aftercoolers. Schramm, Inc., West Chester, Pa.
Schwan—Propeller pumps. Haertel Co., Walter, Minneapolis, Minn.
Schwan—Gas burners. Jamieson Mfg. Co., Dallas, Texas.
Scoggins—Shears and snips. Pacific Machine & Iron Wks., Tacoma, Wash.
Scotch—Adhesive tape. Minnesota Mining & Mfg. Co., St. Paul, Minn.
Scottie Jr.—Boilers. Kewanee-Ross Corp., Kewanee, Ill.
Scout—Water heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Screw-Seal—Pipe. Robinson Clay Product Co., Inc., The, Akron, O.
Scroll-Aire—Air heaters. Newcomb-Detroit Co., Detroit, Mich.
Scruin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Scru-peller—Sewage ejectors and pumps. Chicago Pump Co., Chicago, Ill.
Scru-Tite—Expansion Bolts. Mastercraft Plastics Co., Inc., Jamaica, N. Y.
Sea Lion—Leather belting. Chicago Belting Co., Chicago, Ill.
Sea Rings—Asbestos packing. Johns-Manville, New York, N. Y.
Sealastic—Fittings. Chicago Forging and Mfg. Co., Chicago, Ill.
Seal-Clad—Motors. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Sealdflow—Fans. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Sealeak—Compounds. Ampion Corp., Long Island City, N. Y.
Sealed Life—V-Belts. Dodge Mfg. Corp., Mishawaka, Ind.
Sealfas—Adhesives. Foster Co., Benjamin, Philadelphia, Pa.
Seal Master—Bearings. Stephens-Adamson Mfg. Co., Aurora, Ill.
Sealmore—Cement and compounds. Armite Laboratories, Los Angeles, Calif.
Seal-Rite—Cement and compounds. Macksons Co., New York, N. Y.
Seasonmaker—Air conditioning units. McQuay, Inc., Minneapolis, Minn.
Seasonmaster—Units. McQuay, Inc., Minneapolis, Minn.
Seigelite—Gaskets. Johns-Manville, New York, N. Y.
Seismo-Dampers—Bases. Korfund Co., Inc., Long Island City, N. Y.
Selectair—Air conditioning units. Johnson Co., S. T., Bridgeport, Pa.
Selectric—Electric heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Selectrol—Regulators. Automatic Control Co., St. Paul, Minn.
Sells—Bearings. Royersford Foundry & Machine Co., Royersford, Pa.
Sensatherm—Thermostats. Mercoid Corp., Chicago, Ill.
Sensitrol—Relays. Weston Electrical Instrument Corp., Newark, N. J.
Sentinel—Alarms. Johnson-Williams Ltd., Palo Alto, Calif.
Sentry—Valves. McRae Corp., Los Angeles, Calif.
Sentry—Alarms, and smoke recorders. Edwards, L. V., Rockville Center, N. Y.
Sentry—Draft controls, draft regulators. Krueger Sentry Gauge Co., Green Bay, Wis.
Sep-return—Separators. Wabash Mfg. Co., Chicago, Ill.
Sequestrene—Water softeners. Alrose Chemical Co., Providence, R. I.
Serval—Gaskets. Chicago Gasket Co., Chicago, Ill.
Service—Packing. Johns-Manville, New York, N. Y.
Servicecoat—Enamels and lacquers. Debevoise Co., The, Brooklyn, N. Y.
Sesure—Gages. Yarnall-Waring Co., Philadelphia, Pa.
Sette—Filter. Marquart Mfg. Co., Oakland, Calif.
"77"—Pipe coverings. Eagle-Picher Co., Cincinnati, O.
Severn—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Shafconaire—Unit heaters. OverHead Heaters, Inc., Detroit, Mich.
Shafer—Bearings. Chain Belt Co., Milwaukee, Wis.
Shawco—Bends, headers. Shaw Co., Benjamin F., Wilmington, Del.
Shelby—Tubing. National Tube Div., United States Steel Corp., Pittsburgh, Pa.
Shield-Arc—Electrodes, arc welders. Lincoln Electric Co., Cleveland, O.
Shockmounts—Bases and pads. Lord Mfg. Co., Erie, Pa.
Shokstop—Absorbers. Wade Mfg. Co., Elgin, Ill.
Shone—Sewage ejectors. Yeomans Bros. Co., Melrose Park, Ill.
Shop King—Welders. Precision Welder Mfg. Co., Chicago, Ill.
Shuntflo—Meters. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Shur-Flo—Switches. Hays Mfg. Co., Erie, Pa.
Shur-Seal—Cement. Chicago Specialty Mfg. Co., Chicago, Ill.
Shutlbrak—Switches. Adam Electric Co., Frank, St. Louis, Mo.
Shut-O-Vent—Louvers and shutters. Reed Unit-Fans, Inc., New Orleans, La.
Signico—Pilot and signal lights. Signal Injector Co., Brooklyn, N. Y.
Silastic—Packing. Dow Corning Corp., Midland, Mich.
Silastic—Industrial adhesive tape. Irvington Varnish & Insulator Div. of Minnesota Mining & Mfg. Co., Irvington, N. J.
Silbraz—Fittings. Walworth Co., New York, N. Y.
Silence Service—Noise elimination. Industrial Sound Control, Inc., Hartford, Conn.
Silent-Auburn—Burners., heaters, air conditioning units. Auburn Burner Co., Auburn, Ind.
Silentblu—Gas burners. Beck Engineering Combustion Kompany, St. Louis, Mo.
Silent-Breeze—Fans, units. Meier Electric & Machine Co., Inc., Indianapolis, Ind.
Silent Duct—Connections. Elgen Mfg. Corp., Long Island City, N. Y.
Silent Korth—Burners. Eckhart Mfg. Co., Inc., Union, N. J.
Silentvane—Fans. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Sil-Fos—Solder. Handy & Harman, New York, N. Y.
Silicone—Protective coatings. Dow Corning Corp., Midland, Mich.
Silimite—Water treatment. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Sillimanite—Refractories and refractory cement. Taylor Sons Co., Charles, Cincinnati.
Siltube—Solder. All-State Welding Alloys Co., Inc., White Plains, N. Y.
Silver Comet—Coatings. Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga.
Silver Steel—Cutters. Atkins Saw Div., Borg-Warner Corp., Indianapolis, Ind.
Silver Stream—Spray nozzles. Skinner Irrigation Co., Troy, O.
Silvertop—Eliminators, traps. Anderson Co., V. D., The, Cleveland, O.
Simplex—Gages. Viking Pump Co., Cedar Falls, Ia.
Simplex—Regulators. Bell & Gossett Co., Morton Grove, Ill.
Simplex—Wrenches. Lowell Wrench Co., Worcester, Mass.
Sim-Trol—Controls. Simplex Mfg. Co., Fond du Lac, Wis.
Single-Flow—Cooling towers. Marley Co., Inc., The, Kansas City, Mo.
Sioux—Electric drills. Albertson & Co., Inc., Sioux City, Ia.
Sirocco—Blowers, fans. American Blower Corp., Detroit, Mich.
Skelly—Stokers. Combustion Engineering-Inc., New York, N. Y.
Skip-Tooth—Dies. Nye Tool Co., Chicago, Ill.
Sky-Blast—Roof fan ventilators. Propellair Div., Robbins & Myers Inc., Springfield, O.
Skymaster—Ventilators. Acme Equipment Co., Muskogee, Okla.
Slender—Direct radiation. Dunkirk Radiator Corp., Dunkirk, N. Y.
Slo-Speed—Reducers. Sterling Electric Motors, Inc., Los Angeles, Calif.
Sludgout—Fuel oil treatment. Metropolitan Refining Co., Inc., Long Island City, N. Y.
Slugin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Smith—Filters. Evans Corp., The, George, Moline, Ill.
Smith-Dolan—Electric preheaters and stress relievers. Electric Arc, Inc., Newark, N. J.
Smith-Mills—Boilers. Smith Co., Inc., H. B., Westfield, Mass.
Smithway—Motors. Smith Corp., A. O., Eastern Motor Div., Dayton, O.
Smoothcote—Insulation, building. Insulite Div., Minnesota & Ontario Paper Co., Minneapolis, Minn.
Snapin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Snap-Rite—Ducts and duct fittings. Gray Metal Products, Inc., Rochester, N. Y.
Sno-Breze—Air conditioning units. Palmer Mfg. Corp., Phoenix, Ariz.
Snug—Radiation. Weil-McLain Co., Michigan City, Ind.
Softweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Sola-Flex—Joints. Solar Aircraft Co., San Diego, Calif.
Solar-Flux—Compounds. Solar Aircraft Co., San Diego, Calif.
Solray—Radiation. Weil-McLain Co., Michigan City, Ind.
Sol-vet—Cleaning compounds, water treatment. Anderson-Stolz Corp., Kansas City, Mo.
Sonderglass—Glasses. Chesterton Co., A. W., Everett, Mass.
Sonic-Ray—Heaters. Bica Co., Girard, O.
Sonoairduct—Ducts. Sonoco Products Co., Hartsville, S.C.
Sono-O-Seal—Insulation. General Insulating Products Co., Brooklyn, N. Y.
Soundliner—Insulation. Baldwin-Hill Co., Trenton, N. J.
Sound Metal—Noise elimination. Industrial Sound Control, Inc., Hartford, Conn.
Soundscope—Testers. Marsh Instrument Co., Skokie, Ill.
Sound Stream—Insulation. Industrial Sound Control, Inc., Hartford, Conn.
Sound-Zorbers—Vibration absorbers. Finn & Co., Inc., T. R., New York, N. Y.
South Wind—Heaters. Stewart-Warner Corp., Heating Div., Indianapolis, Ind.
Sovabead—Dehumidifiers. Socony-Vacuum Oil Co., Inc., New York, N. Y.
Sovereign—Packing. Darcoid Co., Inc., New York, N. Y.
Space Saver—Heaters. Payne Furnace Div., Affiliated Gas Equipment Inc., Monrovia, Calif.
Spasaver—Cooler units. Drayer-Hanson, Inc., Los Angeles, Calif.
Spartan—Packing, belting. Graton & Knight Co., Worcester, Mass.
Spearhead—Gasket cutters. Zimmerman Packing Co., Cincinnati, O.
Special X—Solder. Industrial Service Laboratories, Milwaukee, Wis.
Speed Clamps—Hose clamps. Tinnerman Products, Inc., Cleveland, O.
Speed Clips—Insulation fasteners. Tinnerman Products, Inc., Cleveland, O.
Spee-Dee—Blue print and white print machines. Peck & Harvey, Chicago, Ill.
Speedheater—Unit heaters. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Speed Nuts—Locknuts. Tinnerman Products, Inc., Cleveland, O.
Speedomax—Indicator and recorder-controllers, recorders, thermometers. Leeds & Northrup Co., Philadelphia, Pa.
Speed Primer—Pumps. Chain Belt Co., Milwaukee, Wis.
Speed-Trol—Changers. Sterling Electric Motors, Inc., Los Angeles, Calif.
Speedweld—Electrodes. Trindl Products, Ltd., Chicago, Ill.
Speedy—Clamps, cutters, extractors, packing, tools. Chicago Specialty Mfg. Co., Chicago, Ill.
Speedylectric—Generators, heaters. Livingstone Engineering Co., Worcester, Mass.
Speedyvent—Air eliminators. Livingstone Engineering Co., Worcester, Mass.
Spekaluminite—Coatings. Special Chemicals Corp., New York, N. Y.
Spekleen—Compounds. Special Chemicals Corp., New York, N. Y.
Sphero—Blow-off valves. Fairbanks Co., New York, N. Y.
Sphinx—Adhesives. Arabol Mfg. Co., New York, N. Y.
Sphinx—Gas burners and water heaters. Bryant Corp., C. L., Cleveland, O.
Spinner—Gravity ventilators. Warner Ventilator Co., LaGrange, Ind.
Spinner—Ventilators. Inland Steel Products Co., Milwaukee, Wis.
Spintex—Building insulation. Johns-Manville, New York, N. Y.
Spiral-Fin—Radiation. Edwards Engineering Corp., Pompton Plains, N. J.
Spiralock—Pulleys and sheaves. Scientiae Tool Co., Dayton, Ohio.
Spiratube—Ducts and duct fittings. Flexible Tubing Corp., Guilford, Conn.
Spiraweld—Pipes. Naylor Pipe Co., Chicago, Ill.
Spiro—Heaters. Stout & Sons, David, St. Louis, Mo.
Spirodome—Spray nozzles. Fluor Corp., Ltd., The, Los Angeles, Calif.
Spiro-Jet—Gas burners. Thermapanels, Inc., Santa Clara, Calif.
Spirovane—Fans. Western Blower Co., Seattle, Wash.
Spongex—Bases and pads, gaskets, insulation. Sponge Rubber Products Co., The, Shelton, Conn.
Spotaire—Air conditioning units. Drayer-Hanson, Inc., Los Angeles, Calif.
Spraco—Booths, nozzles, separators, strainers, washers. Spray Engineering Co., Somerville, Mass.
Spra-Rite—Nozzles. Binks Mfg. Co., Chicago, Ill.

Spray-Acoustic—Insulation. Sprayo Flake Co., Chicago, Ill.
Spraywheel—Air washers. Mountain States Equipment Co., Denver, Colo.
Spring-Cork—Gaskets, tape. Spring Packing Corp., Chicago, Ill.
Spring-Felt—Bases and pads, gaskets, tape. Spring Packing Corp., Chicago, Ill.
Springin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Spring-Kote—Adhesives, cement and compounds, insulation. Spring Packing Corp., Chicago, Ill.
Square-Heat—Boilers. Kewanee-Ross Corp., Kewanee, Ill.
Stabilflo—Valves. Foxboro Co., Foxboro, Mass.
Stack-Head—Dampers. Air Control Products, Inc., Coopersville, Mich.
Stainlend—Electrodes. Arcos Corp., Philadelphia, Pa.
Stainweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Standard—Ventilators. Burt Mfg. Co., Akron.
Standardaire—High pressure blowers. Read Standard Corp., Blower-Stoker Div., Erie, Pa.
Standforated—Grilles. Standard Stamping & Perforating Co., Chicago, Ill.
Star-O-Zone—Ozone apparatus. Norwood Associated Engineers Inc., Springfield, Mass.
Star-Quality—Nipples. Star Tubular Products Co., Chicago, Ill.
Statick—Ventilators. Hirschman-Pohle Co., Inc., Le Roy, N. Y.
Stat-o-Seal—Gaskets. Wolfe Co., Inc., The, Franklin C., Culver City, Calif.
Stauffer—Clamps. Adams Pipe Repair Products, El Monte, Calif.
Staxauster—Roof ventilators. Allen Ventilator Div., Production Planning Co., Rochester, Mich.
Staynew—Filters, silencers. Dollinger Corp., Rochester, N. Y.
Stazin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Steamheat—Heating systems, valves. Radiator Valve Co. of America, Philadelphia, Pa.
Steam-Pak—Steam generator unit, heaters. York-Shipley, Inc., York, Pa.
Steelbestos—Metal sheets. American Steel Band Co., Pittsburgh, Pa.
Steelflex—Couplings. Falk Corp., Milwaukee, Wis.
Steen—Cutters, pipe cleaning machines. Continental Machine Co., Chicago, Ill.
Sterilamp—Lamps. Westinghouse Electric Corp., Pittsburgh, Pa.
Sterlco—Controls, pumps, strainers, regulators, traps, valves. Sterling, Inc., Milwaukee.
Sterling—Compressors, condensers, valves, pipe coils. Reynolds Mfg. Co., Springfield, Mo.
Ster-O-Zone—Ozone apparatus. Norwood Associated Engineers, Inc., Springfield, Mass.
Stictite—Cement, insulation. Refractory & Insulation Corp., New York, N. Y.
Stillson—Wrenches. Walworth Co., New York, N. Y.
Stirling—Boilers. Babcock & Wilcox Co., New York, N. Y.
Stok-A-Fire—Stokers. Automatic Firing Corp., St. Louis, Mo.
Stokerator—Stokers. Northern Steel & Stoker Corp., Peoria, Ill.
Stokerelay—Relays. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Stokol—Burners, stokers. Diamond Iron Works, Inc., Minneapolis, Minn.
Stonewall—Board and sheets. Ruberoid Co., New York, N. Y.
Storm Shade—Windows. Ingersoll Products Div., Borg-Warner Corp., Chicago, Ill.
Straitflo—Strainers. Hays Mfg. Co., Erie, Pa.
Streamjet—Spray nozzles. Spraying Systems Co., Bellwood, Ill.
Streamline—Couplings, cutters, fittings, heat exchangers, manifolds, nipples, pipe, strainers, tubing, unions, valves. Mueller Brass Co., Port Huron, Mich.
Streamlined—Chambers. Green Fire Brick Co., A. P., Mexico, Mo.
Streamliner—Registers. Auer Register Co., Cleveland, O.
Streamliner—Belting. New York Belting & Packing Co., Passaic, N. J.
Stronghold—Belting. Rhoads & Sons, J. E., Philadelphia, Pa.
Studin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Stud-Pak—Insulation. United States Mineral Wool Co., Stanhope, N. J.
Submersion—Boilers, water heaters. Stout & Sons, David, St. Louis, Mo.
Sudden Depth—Drill. Paine Co., Addison, Ill.
Sullivan—Controls. Cole-Sewell Engineering Co., St. Paul, Minn.
Sunair—Heaters. Mission Appliance Corp., Hawthorne, Calif.
Sunrad—Direct radiation, hangers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Super—Transformers. Union Electric & Mfg. Co., Jersey City, N. J.
Super Air Screws—Fans. Marathon Electric Mfg. Corp., Wausau, Wis.
Supercutno—Packing. Greene, Tweed & Co., North Wales, Pa.
Superector—Wrenches. Williams & Co., J. H., Buffalo, N. Y.
Superex—Pipe insulation. Johns-Manville, New York, N. Y.
Super-Felt—Insulation. Johns-Manville, New York, N. Y.
Superfin—Furnaces. American Foundry & Furnace Co., Bloomington, Ill.
Super-Fine—Insulation. Libbey-Owens-Ford Glass Co., Toledo, O.
Super Finish—Insulation. Refractory & Insulation Corp., New York, N. Y.
Super-Flo—Dehydrators, filters. Remco, Inc., Zelienople, Pa.
Superflo—Heaters. Payne Furnace Div., Affiliated Gas Equipment Inc., Monrovia, Calif.
Superflux—Solder. Paul-Lewis Laboratories, Inc., Milwaukee, Wis.
Superheat—Gas burners. Selas Corp. of America, Philadelphia, Pa.
Superior—Fans. American Foundry & Furnace Co., Bloomington, Ill.
Superior—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Super-Power—Drives. Baldwin Belting, Inc., New York, N. Y.
Superratchet—Ratchet Wrenches. Williams & Co., J. H., Buffalo, N. Y.
Superrench—Tools. Williams & Co., J. H., Buffalo, N. Y.
Super-Saw—Tools. R C S Tool Sales Corp., Joliet, Ill.
Superseal—Fittings. Grinnell Co., Inc., Providence, R. I.
Super 7—V belts. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Super Silvertop—Traps. The V. D. Anderson Co., Cleveland, O.
Super "66"—Insulation. Eagle-Picher Co., Cincinnati, O.
Supersheat—Gaskets. Greene, Tweed & Co., North Wales, Pa.
Super T—Systems. Tork Clock Co., Mount Vernon, N. Y.
Supertan—Leather belting and v-belts. Baldwin Belting, Inc., New York, N. Y.
Supertemp—Insulation. Eagle-Picher Co., Cincinnati, O.
Supertherm—Heating systems. Ross Engineering Corp., J. O., New York, N. Y.
Super Thermo Stucco—Cement. Chicago Fire Brick Co., Chicago, Ill.
Super-Vacuum Vent—Roof ventilators. Octagon Ventilator Co., Chicago, Ill.
Super X—Sheets. Western Brass Mills, Metals Div. of Olin Industries, Inc., East Alton, Ill.
Super X—Coatings. Nelson Mfg. Co., B. F., Minneapolis, Minn.
Sureclor—Feeders. Paddock Engineering Co., of Texas, Dallas, Tex.
Sure Return—Condensation return pumps. Chicago Pump Co., Chicago, Ill.
Sureweld—Electrodes, welders. National Cylinder Gas Co., Chicago, Ill.
Surfamax—Pipe line filters. Micro Metallic Corp., Glen Cove, N. Y.
Surtec—Compounds. Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
Sweatflow—Valves Quality Specialty Co., Inc., Camden, N. J.
Sylphon—Steam traps. Webster & Co., Warren, Camden, N. J.
Synchro—Valves. The Bristol Co., Waterbury, Conn.
Synchro-Lectric — Viscosimeters. Brookfield Engineering Laboratories, Inc., Stoughton, Mass.
Synchro-Meter—Meters. Bailey Meter Co., Cleveland, O.
Synchron—Motors. Hansen Mfg. Co., Inc., Princeton, Ind.
Synchro-Thermetron—Heating systems. Whittington Pump & Engineering Corp., Indianapolis, Ind.
Synchrotie—Recorders. Westinghouse Electric Corp., Pittsburgh, Pa.
Syncretizer—Unit ventilators. Nesbitt, Inc., John J., Philadelphia, Pa.
Syncro—Gages, regulators, combustion control systems. Canton Stoker Corp., Canton, O.
Syncrogear—Speed reducers. U. S. Electrical Motors, Inc., Los Angeles, Calif.
Syndolag—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
Synrub—Wire. United States Rubber Co., New York, N. Y.
Syphonaire—Ventilators. Western Engineering & Mfg. Co., Venice, Calif.

T. N.—Valves. Imperial Brass Mfg. Co., Chicago, Ill.
T. T.—Smoke guns. Hill, E. Vernon & Co., Lake Geneva, Wis.
Tabasco—Water heaters. Kewanee-Ross Corp., Kewanee, Ill.
TAC—Wrenches. Tubing Appliance Co., Los Angeles, Calif.
Tampin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Tanco—Insulation, duct, sound deadening. Thompson and Co., Oakmont, Pa.
Tank-Kleen—Fuel oil treatment. Celco Corp., New York, N. Y.
Tank-O-Meter—Gages, indicators. Uehling Instrument Co., Paterson, N. J.
Tanktrol—Regulators, sprinkler systems controls. Automatic Control Co., St. Paul.
Tannate—Belting, packing. Rhoads & Sons, Sons, J. E., Philadelphia, Pa.
Tannate-Rockwood—Belt drives. Rhoads & Sons, J. E.,Philadelphia, Pa.
Taper-Lock—Couplings, V-belt drives. Dodge Mfg. Corp., Mishawaka, Ind.
Tasil—Furnace cement. Taylor Sons Co., Charles, Cincinnati, O.
Tayco—Furnace and refractory cement, refractories. Taylor Sons Co., Charles, Cincinnati, O.
Teco-Steel—High temperature paint. Thompson and Co., Oakmont, Pa.
Teel—Pumps, circulators. Dayton Electric Mfg. Co., Chicago, Ill.
TEG—Humidifiers, sterilizing units. National Air Conditioning Inc., Johnstown, Pa.
Teksag Colloid—Boiler cleaning compounds. Agnew & Tomlinson, Long Island City, N. Y.
Tektolog—Recorders. Fielden Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Tektor—Switches, alarms. Fielden Instrument Div., Robershaw-Fulton Controls Co., Philadelphia, Pa.
Tel-A-Pipe—Identification markers for piping. Western Lithograph Co., Los Angeles, Calif.
Telecator—Gages, recorders and recorder-controllers. Automatic Control Co., St. Paul, Minn.
Telecode—Relays. Benjamin Electric Mfg. Co., Des Plaines, Ill.
Telemaster—Relays. Tork Clock Co., Inc., Mt. Vernon, N. Y.
Tellevel—Switches. Stephens-Adamson Mfg. Co., Aurora, Ill.
Telsor—Gages. Fielden Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Teltru—Anemometers, gages. Hill, E. Vernon & Co., Lake Geneva, Wis.
Temflex—Plastic tubing. Irvington Varnish & Insulator Div. of Minnesota Mining & Mfg. Co., Irvington, N. J.
Templok—Insulation. Armstrong Cork Co., Lancaster, Pa.
Tempmaster—Thermostats. Crown Controls Co., Inc., New Bremen, O.
Tempoint—Thermometers. Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Temp-R-izer—Burners. Laharco Industries, Minneapolis, Minn.
Temproof—Bases and pads. Lord Mfg. Co., Erie, Pa.
Tempscribe—Recorders. Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Temptrol—Insulation. Badham Insulation Co., Inc., Birmingham, Ala.
Tensulate—Insulation. Tennessee Products and Chemical Corp., Nashville, Tenn.
Tergitol—Water treatment. Carbide and Carbon Chemicals Co., A Division of Union Carbide and Carbon Corp., New York, N. Y.
Termin-o-Seal—Seals. Wolfe Co., Inc., The, Franklin C., Culver City, Calif.
Testite—Fittings. General Fittings Co., Providence, R. I.
Texdrive—Pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Texiron—Pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Texrope—V-belt drives, pulleys, v-belts. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Texslide—Motor bases. Allis-Chalmers Mfg. Co., Milwaukee. Wis.
TexSteamers—Boilers. Texsteam Corp., Houston, Tex.
Texsteel—Pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Texolite—Tubing, General Electric Co., Chemical Div., Pittsfield, Mass.
Texway—Bases. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
T Flow—Valves. Quality Specialty Co., Inc., Camden, N. J.
Tharco—Cement. The Armstrong Co., Detroit.
Thawzone—Dehydrant and acid neutralizer. Highside Chemicals Co., Clifton, N. J.
Thermaflex—Ducts and duct fittings, hose. Flexible Tubing Corp., Guilford, Conn.
Therma-Kit—Coils and panels. Thermapanels, Inc., Santa Clara, Calif.
Therma-Koil—Tubing. Thermapanels, Inc., Santa Clara, Calif.
Thermalbridge—Thermometers. Thompson Research & Mfg. Co., Davenport, Fla.
Thermalink—Heaters, preheaters. Electro-Therm, Inc., Silver Spring, Md.
Thermal Electric—Heaters, pipe, preheaters, systems, transformers. Fluid Systems, Inc., New Haven, Conn.
Thermalfuel—Furnaces. Beck Engineering Combustion Kompany, St. Louis, Mo.
Thermalite—High temperature paint. Tropical Paint & Oil Co., Cleveland, O.
Thermatrol—Valves. Schnacke, Inc., Evansville, Ind.

Thermatube—Pre-insulated pipe. Flexible Tubing Corp., Guilford, Conn.
Thermidaire—Furnaces, heaters. Campbell Heating Co., E. K., Kansas City, Mo.
Thermek—Tubing, aftercoolers, chillers, coils, condensers, coolers, exchangers. Heatron, Inc., York, Pa.
Thermo—Expansion valves. Alco Valve Co., St. Louis, Mo.
Thermo—Heaters. American Furnace Co., St. Louis, Mo.
Thermobank—Systems. Kramer Trenton Co., Trenton, N. J.
Thermobestos—Pipe insulation. Johns-Manville, New York, N. Y.
Thermobloc—Air heaters. Prat-Daniel Corp., East Port Chester, Conn.
Thermochek—Controls. Bell & Gossett Co., Morton Grove, Ill.
Thermodaire—Furnaces, heaters, air conditioning units. Campbell Co., E. K., Kansas City, Mo.
Thermo-Draulik—Regulators. Perfex Corp., Milwaukee, Wis.
Thermodulor—Control systems. Carvell Heat Equipment Co., Los Angeles, Calif.
Thermoflex—Strainers, heating systems, radiator orifices, traps, valves. Cashin Co., W. D., Boston, Mass.
Thermoflex—Radiator orifices. Grinnell Co., Inc., Providence, R. I.
Thermofuel—Furnaces. Beck Engineering Combustion Kompany, St. Louis, Mo.
Thermogas—Furnaces. Beck Engineering Combustion Kompany, St. Louis, Mo.
Thermo Grip—Torches. Ideal Industries, Inc., Sycamore, Ill.
Thermoguide—Thermometers. Taylor Instrument Companies, Rochester, N. Y.
Thermo-Humidigraph — Recorder-controllers. Bristol Co., The, Waterbury, Conn.
Thermoil—Furnaces, unit heaters. Beck Engineering Combustion Kompany, St. Louis.
Thermoilgas—Gas and oil burners. Beck Engineering Combustion Kompany, St. Louis, Mo.
Thermoil-Granodine—Protective coatings. American Chemical Paint Co., Ambler, Pa.
Therm-O-Jector—Towers. Imsco Mfg. Co., Dallas, Tex.
Thermolator—Valves. Triplex Heating Specialty Co., Inc., Peru, Ind.
Thermolier—Unit heaters. Grinnell Co., Inc., Providence, R. I.
Thermopane—Windows. Libbey-Owens-Ford Glass Co., Toledo, O.
Thermoswitch—Thermostats, regulators. Fenwal, Inc., Ashland, Mass.
Therm-o-tile—Conduit. Porter & Co., Inc., H. W., Newark, N. J.
Thermotrade—Electrodes. Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
Therm-otrols—Thermometers. Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.
Thermovent—Unit ventilators. Nesbitt, Inc., John J., Philadelphia, Pa.
Thermovoir—Water heaters. Bell & Gossett Co., Morton Grove, Ill.
Thermowell—Thermometer wells. Trinity Equipment Corp., Roselle Park, N. J.
Thermwire—Conductors and Panels. Wiegand Co., Edwin L., Pittsburgh, Pa.
Thin Man—Registers. Register & Grille Mfg Co., Inc., Brooklyn, N. Y.
Thor—Belting. Goodyear Tire & Rubber Co., Akron, O.
Thorobred—V belts and v belt drives. Dayton Rubber Co., Dayton, O.
Thread-Tite—Cement and compounds. Armite Laboratories, Los Angeles, Calif.
Thredolets—Fittings. Bonney Forge & Tool Wks., Allentown, Pa.
3C—Motor controls. Clark Controller Co., Cleveland, O.
3M—Cements and compounds, adhesives, insulation, packing. Minnesota Mining & Mfg. Co., St. Paul, Minn.
Thrift—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.
Thriftymatic—Draft regulators. Engineered Products Co., Philadelphia, Pa.
Throway—Air filters. American Air Filter Co., Inc., Louisville, Ky.
Thur-Ma-Lox—Coatings. Dampney Co., The, Hyde Park, Boston, Mass.
Tico—Galvanized Sheet Steel. Inland Steel Products Co., Milwaukee, Wis.
Ticosteam—Boilers. Titusville Iron Works Co., The, Titusville, Pa.
Ticotherm—Boilers. Titusville Iron Works Co., The, Titusville, Pa.
Tilt Trap—Steam traps. Nason Co., Clarkston, Mich.
Timercoid—Time switches. Mercoid Corp., Chicago, Ill.
Timerelay — Relays. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Time-O-Stat—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Tin-Ezy—Coatings, solder and fluxes. Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Tiny—Traps. Nason Co., Clarkston, Mich.
Titan—Traps. Nason Co., Clarkston, Mich.
Tite Seal—Cement and compounds. Radiator Specialty Co., Charlotte, N. C.
Toastmaster—Heaters. McGraw Electric Co., Chicago, Ill.
Tom Thumb—Pipe machines. Oster Mfg. Co., Cleveland, O.
Toolweld—Electrodes. Lincoln Electric Co. Cleveland, O.
Torchmaster—Torches. Industrial Engineered Products Co., Los Angeles, Calif.
Torchweld—Regulators, valves, welding and cutting apparatus. National Cylinder Gas Co., Chicago, Ill.
Torkflash—Wrenches. Blackhawk Mfg. Co., Milwaukee, Wis.
Tork Master—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.
Torkotherm—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.
Torpedo—Dehydrators, filters. Imperial Brass Mfg. Co., Chicago, Ill.
Torqometer—Torque indicating wrenches. Snap-on Tools Corp., Kenosha, Wis.
Torq-Stop—Wrenches. Richmont, Inc., San Gabriel, Calif.
Torque-Arm—Reducers. Dodge Mfg. Corp., Mishawaka, Ind.
Torrid—Torches. Polis Mfg. Co., J. D., Chicago, Ill.
Trace—Refrigerant leak detectors. Highside Chemicals Co., Clifton, N. J.
Tramrail—Conveyors. Cleveland Tramrail Div., Cleveland Crane & Eng. Co., Wickliffe, O.
Transaire—Transmitters. Taylor Instrument Companies, Rochester, N. Y.
Transflex—Plastic tubing. Irvington Varnish and Insulator Div. of Minnesota Mining and Mfg. Co., Irvington, N. J.
Transite—Conduit, pipe, ducts and duct fittings, refractories, sheets and board. Johns-Manville, New York, N. Y.
Transparent—Analyzers, gages, manometers. Dwyer Mfg. Co., F. W., Chicago, Ill.
Trantex—Adhesives. Johns-Manville, New York, N. Y.
Trap-Dri—Dehydrators. A-P Controls Corp., Milwaukee, Wis.
Trap-it—Filters. A-P Controls Corp., Milwaukee, Wis.
Tray—Cooling towers. New England Cooling Tower Co., Boston, Mass.
Treet-O-Control—Steam system and water treatment. % Proportioneers, Inc. %, Providence, R. I.
Treet-O-Unit—Feeders, pumps. % Proportioneers, Inc. %, Providence, R. I.
Trentweld—Tubing. Crucible Steel Co. of America, Pittsburgh, Pa.
Triad—Stocks and dies. Nye Tool & Machine Co., Chicago, Ill.
Tri-Clad—Motors. General Electric Co., Apparatus Dept., Schenectady, N. Y.
Trident—Meters. Neptune Meter Co., New York, N. Y.
Tri-Flex—Registers, grilles. Tuttle & Bailey, Inc., New Britain, Conn.
Tri-Flux—Motors. Redmond Co., Inc., Owosso, Mich.
Tri-Flux—Solder. Wolfe-Kote Co., Inc., Sheboygan, Wis.
Tri-Guard—Protective coatings. Foster Co., Benjamin, Philadelphia, Pa.
Trimline—Radiation. Vulcan Radiator Co., Hartford, Conn.
Trimtherm—Thermostats. General Controls Co., Glendale, Calif.
Trin-Vue—Sight glasses. Trinity Equipment Corp., Roselle Park, New Jersey
Triple-lok—Fittings. Parker Appliance Co., The, Cleveland, O.
Triple-A—Enamels and lacquers, protective coatings. Quigley Co., Inc., New York, N. Y.
Triple Duty—Heating systems. Bell & Gossett Co., Morton Grove, Ill.
Triple-Seal—Fittings. Imperial Brass Mfg. Co., Chicago, Ill.
Triplex—Stocks and dies. Nye Tool Co., Chicago, Ill.
Tripl-Mix—Cement. Krehbiel Co., J. H., Chicago, Ill.
Tri-Rotor—Pumps. Yale & Towne Mfg. Co., Stamford, Conn.
Tri-snap—Thermostats. Westinghouse Electric Corp., Pittsburgh, Pa.
Triumph—Gages and indicators. Boston Auto Gage Co., Pittsfield, Mass.
Trojan—Boilers. Burnham Corp., Boiler Div., Irvington, N. Y.
Trojan—Stokers. Auburn Burner Co., Auburn Ind.
Tropelite—Coatings. Tropical Paint & Oil Co., Cleveland, O.
Tropic-Aire—Air conditioning units. McGraw Electric Co., Clark Div., Chicago.
Tropic-Breeze—Air conditioning units. Dalzen Mfg. Co., St. Clair, Mich.
Tropilux—Enamels and lacquers. Tropical Paint & Oil Co., Cleveland, O.
Tru-Air—Air conditioning units, condensers, dehumidifiers, heaters. Blazer, M., & Son, Passaic, N. J.
Truespot—Testers. Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Truflex—Bi-metals. General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Truflex—Drives, V. Belt. Gates Rubber Co., The, Denver, Colo.
Truliradiant—Gas burners. Gordon & Piatt, Winfield, Kan.
Truliradiant—Gas burners. Sullivan Valve & Engineering Co., Butte, Mont.
Trumark—Protractor for marking pipe. Tru-Line Corp., Los Angeles, Calif.
Tru-Set—Fasteners. Ramset Div., Olin Industries, Inc., Cleveland, O.
Try-Me—Regulators, strainers, valves. Tryco Products, Inc., Westfield, Mass.
Tubecote—Protective coatings. Wilhelm Co., A., Reading, Pa.
Tubejet—Compressors, ejector type vacuum pump. Economy Pumps Inc., Div. of Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Tube-Tite—Pipe hangers and supports. Titchener, E. H. & Co., Binghamton, N. Y.
Tuff-Bond—Adhesives, cement. Moore Inc., Goodloe E., Danville, Ill.
Tufflex—Insulation. Wood Conversion Co., St. Paul, Minn.
Tuf-flex—Gage and sight glasses. Libbey-Owens-Ford Glass Co., Toledo, O.
Tufflite—Pipe. Michigan Plastic Pipe Co., Detroit, Mich.
Tut-On—Protective coatings. Brooklyn Varnish Mfg. Co., Brooklyn, N. Y.
Tulox—Tubing. Extruded Plastics, Inc., Norwalk, Conn.
Tumblin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Tungweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.
Turbinair—Motors. Joy Mfg. Co., Pittsburgh, Pa.
Turbine Driven—Heaters. Wing Mfg. Co., L. J., New York, N. Y.
Turbo—Air washers, spray nozzles. Bayley Blower Co., Milwaukee, Wis.
Turbo-Aire—Overfire air jets. Canton Stoker Corp., Canton, O.
Turb-Flo—Water chillers. Drayer-Hanson, Inc., Los Angeles, Calif.
Turbo Vane—Fans and blowers. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Turbulaire—Dryers. Western Precipitation Corp., Los Angeles, Calif.
Turcoat—Coatings. Turco Products, Inc., Los Angeles, Calif.
Turret—Pumps. Yeomans Bros. Co., Melrose Park, Ill.
Tu-way—Radiation. Brown Products Co., Forest Hills, N. Y.
20th Century—Bearings. Roller Bearing Co., of America, West Trenton, N. J.
Twin Contact—Controls, switches, thermostats. Perfex Corp., Milwaukee, Wis.
Twindow—Heat insulating windows. Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Twin-Flow—Cooling towers. Marley Co., The, Kansas City, Mo.
Twin G-Fin—Preheaters. Griscom-Russell Co., The, Massillon, O.
Twin-Line—Pumps. Cooper-Bessemer Corp., The, Mt. Vernon, O.
Twin Seal—Check valves, gage testers. Mansfield & Green, Cleveland, O.
2-in-1—Sealing compounds. Utility Laboratory, Inc., Brooklyn, N. Y.
Tygon—Protective coatings, plastic tubing. U. S. Stoneware Co., New York, N. Y.
Tylox—Pipe couplings. United States Stoneware Co., New York, N. Y.
Tymit—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.

U. S. AirFlow—Radiation. United States Radiator Corp., Detroit, Mich.
U S—Fittings, flanges, tank plugs. U. S. Plug & Fitting Co., Wellington, O.
U. S.—Heaters. United States Radiator Corp., Detroit, Mich.
US-Capitol—Boilers, hangers or brackets, heaters, radiation. United States Radiator Corp., Detroit, Mich.
US-Capitolaire—Air conditioning units, furnaces. United States Radiator Corp., Detroit, Mich.
U. S. Fin-Ray—Radiation. United States Radiator Corp., Detroit, Mich.
USG—Louvers and shutters. United States Gypsum Co., Chicago, Ill.
U. S. Lok-Fin—Radiation. United States Radiator Corp., Detroit, Mich.
U. S. Radiant Baseboard—Radiation. United States Radiator Corp., Detroit, Mich.
U. S. S.—Angles, sheets. United States Steel Co., Pittsburgh, Pa.
U. S. S.—Pipe, tubing. National Tube Div., United States Steel Corp., Pittsburgh, Pa.
U-S-S—Sheets, angles. Columbia-Geneva Steel Div., United States Steel Corp., San Francisco, Calif.
USS—Sheets. Tennessee Coal, Iron & Railroad Co., United States Steel Corp. Subsidiary, Birmingham, Ala.
U. S. Solar Flame—Oil burners. United States Radiator Corp., Detroit, Mich.
U. S. Sunray—Radiation. United States Radiator Corp., Detroit, Mich.

Ucilon—Protective coatings, high temperature paint. United Chromium, Inc., New York, N. Y.
Ugasco—Gaskets. United States Gasket Co., Camden, N. J.
U-Loy—Sheets. Republic Steel Corp., Cleveland, O.
Ultra-Aire—Filters. Mine Safety Appliances Co., Pittsburgh, Pa.
Ultrafine—Insulation. Gustin-Bacon Mfg. Co., Kansas City, Mo.
Ultralite—Insulation. Gustin-Bacon Mfg. Co., Kansas City, Mo.
Ultra-Viscoson—Viscosimeters. Rich-Roth Laboratories, East Hartford, Conn.
Unaflow—Steam engines. Ames Iron Works, Div. of Pierce Butler Radiator Corp., Oswego, N. Y.
Unarco—Insulation, gaskets. packing, Insulating cement, condensers, heaters, radiation, surface cooling & heating, towers, air conditioning units. Union Asbestos & Rubber Co., Chicago, Ill.
Unbrako—Repair plugs, screws. Standard Pressed Steel Co., Jenkintown, Pa.
Unibestos—Insulation. Union Asbestos & Rubber Co., Chicago, Ill.
Uni-Cast—Motors. Redmond Co., Inc., Owosso, Mich.
Unichrome—Enamels and lacquers, protective coatings. United Chromium Inc., New York.
Uniclosed—Electric motors. U. S. Electrical Motors, Inc., Los Angeles. Calif.
Unicoils—Finned surfaces. Clarage Fan Co., Kalamazoo, Mich.
Unicon—Refrigerating condensers. Kramer Trenton Co., Trenton, N. J.
Uniduct—Ducts and duct fittings. General Corporation, Minneapolis, Minn.
Uni-fin—Grilles, registers. Barber-Colman Co., Rockford, Ill.
Uniflare—Fittings. Scovill Mfg. Co., Waterbury, Conn.
Uniflex—Absorbers, hose. Titeflex, Inc., Newark, N. J.
Uniflex—Metal hose. Brockway Co., Naugatuck, Conn.
Uni-flo—Dampers, diffusers, grilles, registers. Barber-Colman Co., Rockford, Ill.
Uniflow—Oil burners. Ace Engineering Co., Chicago, Ill.
Uniloy—Steel sheets. Universal-Cyclops Steel Corp., Bridgeville, Pa.
Unipack—Welding fume exhausters, centrifugal fans. American Machine Products Co., Marshalltown, Ia.
Uni-Pull—Flat belt drives. Rhoads & Sons, J. E., Philadelphia, Pa.
Unipump—Pumps. Weinman Pump Mfg. Co., Columbus, O.
Unishears—Electric shears. Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.
Unisorb—Bases and pads. Felters Company, The, Boston, Mass.
Unistage—Aftercoolers. Schramm, Inc., West Chester, Pa.
Unitair—Air compressors. Joy Mfg. Co., Pittsburgh, Pa.
Unitaire—Air conditioning units. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Unitem—Heaters. Bell & Gossett Co., Morton Grove, Ill.
Unitherm—Unit heaters. Clarage Fan Co., Kalamazoo, Mich.
Unitite—Valves. Hanna Engineering Wks., Chicago, Ill.
Unit-Line—Johnston Pump Co., Pasadena, Calif.
UniTrane—Air conditioning units. Trane Co., The, La Crosse, Wis.
Unitype—Pumps. Pacific Pumping Co., Oakland, Calif.
Universal—Benders. Hossfeld Mfg. Co., Winona, Minn.
Universal Burners. Dalzen Mfg. Co., St. Clair, Mich.
Universal—Cast iron pipe. Central Foundry Co., Newark, N. J.
Universal—Centrifugal pumps. Bell & Gossett Co., Morton Grove, Ill.
Universal—Gas and oil burners. Mettler Co., Inc., The, Los Angeles, Calif.
Universal—Packing. Johns-Manville, New York, N. Y.
Universal—Pipe cutters. Nye Tool Co., Chicago, Ill.
Universal—Regulators. Dockson Corp., Detroit, Mich.
Universal Unaflow—Engines. Skinner Engine Co., Erie, Pa.
Universal—Pumps, air conditioning units. Wright Mfg. Co., Phoenix, Ariz.
Uni-Wash—Dust collectors. Newcomb-Detroit Co., Detroit, Mich.
Uno Turbine—Ventilators. Uno Ventilator Co., Malden, Mass.
Unxld—Regulators. Parker-Kalon Div., General American Transportation Corp., New York, N. Y.
Upson—Bolts and studs. Republic Steel Corp., Bolt & Nut Div., Cleveland, O.
usAIRco—Air conditioning equipment, blowers, condensers, fans, heaters. United States Air Conditioning Corp., Minneapolis, Minn.
UsAIRconditioner—Air conditioning units. United States Air Conditioning Corp., Minneapolis, Minn.
Uskon—Conductors. United States Rubber Co., New York, N. Y.
Utilitube.—Aluminum tubing. Aluminum Co. of America, Pittsburgh.
Utility—Blowers. American Blower Corp., Detroit, Mich.
Utility—Roof ventilators. Arex Co., Chicago.
Utility—Heaters. Wing Mfg. Co., L. J., New York, N. Y.

V•S—Changers. Reliance Electric & Engineering Co., Cleveland, O.
Vacumatic—Ejectors, pumps. Whittington Pump & Engineering Corp., Indianapolis.
Vacu-Flo—Fittings. H-P Products, Inc., Louisville, O.
Vacuumstat—Switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Vad—Cooling towers. Young Radiator Co., Racine, Wis.
Valcalox—Damper regulators. Young Regulator Co., Cleveland, O.
Valdura—Paint. American-Marietta Co., Chicago, Ill.
Valvactor—Valve operators. Foxboro Co., Foxboro, Mass.
Valvent—Roof ventilators, Swartwout Co., Cleveland, O.
Valvrator—Valves. Fischer & Porter Co., Hatboro, Pa.
Vane-O-Line—Registers. Louvra Corp., The, Union, N. J.
Vane-Runner—Vanes. Duro-Dyne Corp., Hempstead L. I., N. Y.
Vape-Sorber—Filters, Selas Corp. of America, Philadelphia, Pa.
Vaporene—Corrosion inhibition. Metropolitan Refining Co., Inc., Long Island City, N. Y
Vapor-Clarkson—Heating and process boilers. Vapor Heating Corp., Chicago, Ill.
Vaporstat—Switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Va-pur-izer—Room type unit humidifiers. Crowell & Dunn, Inc., New York, N. Y.
Varidrive—Speed changers. U. S. Electrical Motors, Inc., Los Angeles, Calif.
Varipitch—Pulleys and sheaves. Gates Rubber Co., The, Denver, Colo.
Vari-Pitch—Speed changers, pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Vari-Temp—Air conditioning units. Dunham Co., C. A., Chicago, Ill.
Vari-Vac—Heating systems. Dunham Co., C. A., Chicago, Ill.
Vari-Vent—Valves. Dole Valve Co., Chicago, Ill.
Vaultmaster—Air conditioning units. Haertel Co., Walter, Minneapolis, Minn.
Veco—Analyzers, combustion testing kits, Recorders, testers. Victory Engineering Corp., Union, N. J.
Veeco—Leak detectors. Vacuum-Electronic Engineering Co., New Hyde Park, L. I., N. Y.
Vee Jet—Spray nozzles. Spraying Systems Co., Bellwood, Ill.
Veelos—V-belts. Manheim Mfg. & Belting Co., Manheim, Pa.
Velometer—Air velocity meters, anemometers Illinois Testing Laboratories, Inc., Chicago, Ill.
Ventalarm—Alarms, gages. Scully Signal Co., Cambridge, Mass.
Ventfab—Connections, duct, flexible. Iden Associates, Chicago, Ill.
Ventglas—Connections, duct, flexible. Iden Associates, Chicago, Ill.
Vento—Traps. Haines & Co., Inc., William S., Div. Sellers Injector Corp., Philadelphia, Pa.
Vent-Rite—Air valves. Anderson Products, Inc., Cambridge, Mass.
Ventube—Ducts and duct fittings. E. I. du Pont de Nemours & Co., Inc., Fabrics & Finishes Dept., Wilmington, Del.
Ventura—Fans. American Blower Corp., Detroit, Mich.
Venturafin—Unit heaters. American Blower Corp., Detroit, Mich.
Venturi—Fan housings. Commercial Shearing & Stamping Co., Youngstown, O.
Venturi—Meters. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Venturi-Flo—Air diffusers. Barber-Colman Co., Rockford, Ill.
Vent-Vac—Heating systems. Anderson Products, Inc., Cambridge, Mass.
Ventvinyl—Connections. Iden Associates, Chicago, Ill.
Verco—Insulating cement. Nelson Mfg. Co., B. F., Minneapolis, Minn.
Vercoustic—Insulation. Nelson Mfg. Co., B. F., Minneapolis, Minn.
Vermiculite—Insulation. International Vermiculite Co., Girard, Ill.
Vernier-Set—Time switches. Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Versa-Liners—Blue and white print machines. Peck & Harvey, Chicago, Ill.
Vertical—Unit heaters. American Blower Corp., Detroit, Mich.
Vertiflow—Unit heaters. Young Radiator Co., Racine, Wis.
V-Flat—Pulleys and sheaves. Dayton Rubber Co., Dayton, O.
Vibracork—Bases and pads. Korfund Co., Inc., Long Island City, N. Y.
Vibraglass—Bases and pads. Glass Fibers, Inc., Toledo, O.
Vibrasafe—Absorbers. Pleasantaire Corp., Washington, D. C.
Vibrashock—Bases and pads. Robinson Aviation, Inc., Vibrashock Div. Teterboro, N. J.
Vibra-sorber—Vibration absorbers. Flexonics Corp., Maywood, Ill.
Vibro-Bar—Bases and pads. Korfund Co., Inc., Long Island City, N. Y.
Vibro-Hangers. Pipe hangers and supports. Korfund Co., Inc., Long Island City, N. Y.
Vibro Insulators—Bases. Goodrich Co., B. F., Akron, O.
Vibro-Isolator—Bases and pads. Korfund Co., Inc., Long Island City, N. Y.
Vichrome—Coatings, enamels. Interchemical Corp., Finishes Div., Newark, N. J.
Vic-O-Seal—Gaskets. Vickers, Inc., Div. of Sperry Corp., El Segundo, Calif.
Victory—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
V-in-Tah—Paint. American-Marietta Co., Chicago, Ill.
Vim—Gaskets, leather packing. Houghton & Co., E. F., Philadelphia, Pa.
Vim Tred—Leather belting. Houghton & Co., E. F., Philadelphia, Pa.
Vinsynite—Coatings. Thompson and Co., Oakmont, Pa.
Vinyl—Coatings. Gates Engineering Co., Wilmington, Del.
Visaflame—Controls. Mercoid Corp., The, Chicago, Ill.
Visco—Preheaters. Crotty Mfg. Corp., Long Island, N. Y.
Viscorator—Viscosimeters. Fischer & Porter Co., Hatboro, Pa.
Visi Flo—Sight glasses. O P W Corp., Cincinnati, O.
Visi—Float. Air filter gages. F. W. Dwyer Mfg. Co., Chicago.
Visoleak—Leak detectors. Allin Mfg. Co., Chicago, Ill.
Vistand—Vise stands. Armstrong Mfg. Co., Bridgeport, Conn.
Vitalloy—Wrenches. Billings & Spencer Co., Hartford, Conn.
Vitreon—Pipe. Robinson Clay Product Co., Inc., The, Akron, O.
Vitricel—Refractories. Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Vitriram—Furnace cement. U. S. Stoneware Co., New York, N. Y.
Vix-Syn—Rubber and synthetic packing. Houghton & Co., E. F., Philadelphia, Pa.
V-Meth-L—Refrigerants. Virginia Smelting Co., West Norfolk, Va.
Voladjuster—Dampers, remotely operated volume control. Barber-Colman Co., Rockford, Ill.
Volcano—Ventilators. Iwan Brothers, South Bend, Ind.
Volcano—Torches. Industrial Engineered Products Co., Los Angeles, Calif.
Volocitrol—Louvers, regulators. Barber-Colman Co., Rockford, Ill
Vol-O-Flo—Meters. National Instrument Laboratories, Inc., Riverdale, Md.
Voriflow—Burners. Orr & Sembower, Inc., Reading, Pa.
Vornado—Fans, air conditioning units. Sutton Corp., O. A., The, Wichita, Kan.
Vortex—Pumps. Lawrence Pump & Engine Co., Lawrence, Mass.
Vortex—Nozzles. Phillips Cooling Tower Co., Inc., Brooklyn, N. Y.
V-to-V—Pulleys and sheaves. Dayton Rubber Co., Dayton, O.
Vulcalock—Fittings, pipe, tanks, valves. Goodrich Co., B. F., Akron, O.
Vulcan—Stands, tongs, vises. Williams & Co., J. H., Buffalo, N. Y.
Vulcan—Stokers. Canton Stoker Corp., Canton, O.
Vulcan-Hartford—Heating surface. Vulcan Radiator Co., Hartford, Conn.
Vulcan Superior—Tongs, vises. Williams & Co., J. H., Buffalo, N. Y.
Vulco—Belts, drives, pulleys. Gates Rubber Co., Denver, Colo.
Vulcomount—Pulleys. Gates Rubber Co., Denver, Colo.
Vynal—Coatings. Watson-Standard Co. Pittsburgh, Pa.
Vyncote—Coatings. Watson-Standard Co. Pittsburgh, Pa.
W. & McD.—Strainers. Watson & McDaniel Co., Philadelphia, Pa.
W-S—Fittings. Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.
W & T—Anemometers, feeders, gages, indicators, hygrometers, dew point recorders, meters, relays. Wallace & Tiernan Co., Inc., Newark, N. J.
WTP—Boilers. Titusville Iron Wks., Co., The, Titusville, Pa.
W & W—Pipe hangers. Western Wire Prod-

ucts Co., St Louis, Mo.
Wakefield—Fittings, pipe, pumps, tanks and valves. Lead Lined Iron Pipe Co., Wakefield, Mass.
Walco-Parmelee—Wrenches. Walworth Co., New York, N. Y.
Walltube—Radiator brackets. Arjac Products Inc., Rochester, N. Y.
Walseal—Fittings, valves. Walworth Co., New York, N. Y.
Walvector—Radiations. Webster & Co., Warren, Camden, N. J.
Warco—Combustion chambers, refractories. Walsh Refractories Corp., St. Louis, Mo.
Warco—Valves. Bridgeport Brass Co., Bridgeport, Conn.
Warco—Fuel oil treatment. Warren Refining & Chemical Co., The, Cleveland, O.
Warcolite—Enamels and lacquers. Warren Refining & Chemical Co., The, Cleveland, O.
Warnock—Wrenches. Lowell Wrench Co., Worcester, Mass.
Wat-a-mat—Water meters. Pfening Co., Fred D., Columbus, O.
Watco—Cooling towers, humidifiers, spray nozzles, spraying systems. Water Cooling Corp., New York, N. Y.
Water-Boy—Feeders, alarms, valves. Maid-O'-Mist, Inc., Chicago, Ill.
Water-King—Pumps. Peerless Pump Div., Food Machinery and Chemical Corp., Los Angeles, Calif.
Water-Maker—Water heaters. Catskill Metal Works, Inc., Catskill, N. Y.
Water-Mun—Heaters. Mund Boilers, Inc., Los Angeles, Calif.
Waterspar—Enamels and lacquers. Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Wat-R-Miser—Condensers. Drayer-Hanson, Inc., Los Angeles, Calif.
Way Loctor—Doors and panels. Walsh, The, L. M., Co., Boston, Mass.
Wear-Proof—Pumps. Schneible Co., Claude B., Detroit, Mich.
Wearweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Weather-Chron—Time switches. Automatic Devices Co., Inc., Western Springs, Ill.
Weather-Damper—Operators, regulators. Automatic Devices Co., Inc., Western Springs, Ill.
Weather-Flo—Thermostats, control systems, regulators. Automatic Devices Co., Inc., Western Springs, Ill.
Weathermaker—Unit air conditioners. Carrier Corp., Syracuse, N. Y.
Weather-Man—Regulators, switches, thermostats, control systems. Automatic Devices Co., Inc., Western Springs, Ill.
Weatherstat—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Webco—Brakes. Webb Machine & Tool Co., Imperial, Pa.
Weber's—Forty-Eight Insulations, Inc., Aurora, Ill.
Webster-Nesbitt—Unit heaters. Webster & Co., Warren, Camden, N. J.
Webster-Nesbitt "Little Giant"—Unit heaters. Nesbitt, Inc., John J., Philadelphia, Pa.
Weco—Plugs, steel unions. Chiksan Co., Brea, Calif.
Weco—Gas burners. Webster Engineering Co., Tulsa, Okla.
Wedgbelt—V belts and v-belt drives, pulleys. American Pulley Co., Philadelphia, Pa.
Wee Scot—Boilers. Titusville Iron Works Co., The, Titusville, Pa.
Weir—Stokers. Meyer Furnace Co., The, Peoria, Ill.
Weiralead—Lead alloy coated sheets. Weirton Steel Co., Weirton, W. Va.
Weir-Meyer—Furnaces. Meyer Furnace Co., The, Peoria, Ill.
Weirzin—Electrolytic zinc coated sheets. Weirton Steel Co., Weirton, W. Va.
Weldaluminite—Welding compounds. Special Chemicals Corp., New York, N. Y.
Weldells—Welding fittings. Taylor Forge & Pipe Works, Chicago, Ill.
Weld-Ends—Couplings. Wachs Co., E. H., The, Chicago, Ill.
Weldolets—Fittings. Bonney Forge & Tool Works, Allentown, Pa.
WesCo—Solenoids. West Coast Electric Mfg. Co., Los Angeles, Calif.
Western—Fans, furnaces, heaters. International Sales Co., San Francisco, Calif.
Westernaire—Fans. Western Engineering & Mfg. Co., Venice, Calif.
Western—Ventilators. Western Engineering & Mfg. Co., Venice, Calif.
Westo—Water treatment. Western Chemical Co., Kansas City, Mo.
Wheeler-Economy—Ejectors, pumps. Economy Pumps Inc., Div. of Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Whirlcone—Spray nozzles. Water Cooling Equipment Co., St. Louis, Mo.
Whirljet—Spray nozzles. Spraying Systems Co., Bellwood, Ill.
Whisper-Quiet—Heaters. Zink Co., John, Tulsa, Okla.
Whitson—Steam traps. Healy Ruff Co., St. Paul, Minn.
Wig-O-Flex—Couplings. Wiggins Oil Tool Co., Inc., E. B., Los Angeles, Calif.
Wilco—Bi-metals. Wilson Co., H. A., The, Union, N. J.
Wilco—Pipe cutting machines. Oster Mfg. Co., Cleveland, O.
Will-Cool—Oil coolers. Taco Heaters, Inc., Providence, R. I.
Williams-Hager—Valves. Williams Gauge Co., The, Pittsburgh, Pa.
Wilmington—Air compressors. Electric Spray-it Co., The, Sheboygan, Wis.
Windial—Anemometers. Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Wind-O-Cool—Fans. Belter Electric Mfg. Co., G. J., The, St. Louis, Mo.
Wind-O-Vent—Window ventilator and filter units. Reed Unit-Fans, Inc., New Orleans, La.
Wingfoil—Ventilators, exhausters. Wing Mfg. Co., L. J., Linden, N. J.
Winkler—Burners, stokers, units. U. S. Machine Corp., Div. of Stewart-Warner Corp., Lebanon, Ind.
Winter-Chaser—Air conditioning units, furnaces, heaters. Campbell Heating Co., Des Moines, Ia.
Wissco—Grilles. Wickwire Spencer Steel Div. of Colorado Fuel & Iron Corp., New York, N. Y.
Witch—Bolts, clamps, hangers, protectors. Carpenter & Paterson, Inc., East Boston, Mass.
Wolfe-Linde—Condensers, fittings, valves. Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Wonder—Tubing benders. American Pipe Bending Machine Co., Inc., Poultney, Vt.
Wondaire—Heaters. Cox Mfg. Co., Ridgeville, Ind.
Wovenstone—Pipe insulation. Union Asbestos & Rubber Co., Cicero, Ill.
Wrap-On—Pipe insulation, electric cable. Gro-Quick Co., Chicago, Ill.
Wurtzilite—Coatings. Ohmlac Paint & Refining Co., Inc., Long Island City, N. Y.

X-L—Gaskets, packing. Excelsior Leather Washer Co., Rockford, Ill.
Xacto—Meters. Bowser, Inc., Fort Wayne, Ind.
"X" Boilerliquid—Compounds. X Laboratories, Inc., New York, N. Y.
"X" Flush-Rustoff—Boiler cleaning compounds. X Laboratories, Inc., New York, N. Y.
"X" Pipejoin—Cement and compounds. X Laboratories, Inc., New York, N. Y.
Xit—Ventilators. Iona Ventilator Co., Inc., Philadelphia, Pa.
X. X.—Punches. Parker-Kalon Div., General American Transportation Corp., New York, N. Y.

Yager's—Solder. Benson Co., Inc., Alex R., Hudson, N. Y.
Yarway—Alarms, clamps, expansion joints, recorders, nozzles, strainers, traps, valves. Yarnall-Waring Co., Philadelphia, Pa.
Yellow-Jacket—Heating boilers. Burnham Corp., Boiler Div., Irvington, N. Y.
Yellow Jacket—Pre-insulated pipe. American Insulated Pipe Co., New York, N. Y.
Yoloy—Pipe, sheet, tubing. Youngstown Sheet & Tube Co., Youngstown, O.
Yorkaire—Unit air coolers. York Corp., York, Pa.
York-Power—Oil burners. York-Shipley, Inc., York, Pa.
Yulatrol—Fuel oil preheaters. Yula Water Heaters, Inc., New York, N. Y.

Zapon—Enamels and lacquers. Atlas Powder Co., North Chicago, Ill.
Z-Crete—Pipe insulation. Zonolite Co., Chicago, Ill.
Zephyrweld—Pipe fittings. Tri-Clover Machine Co., Kenosha, Wis.
Zero—Cement, refractories. Standard Fuel Engineering Co., Detroit, Mich.
Zero—Pipe insulation. Johns-Manville, New York, N. Y.
Zeropaks—Coolers. McQuay, Inc., Minneapolis, Minn.
Zig Zag—Heat exchangers. Stout & Sons, David, St. Louis, Mo.
Zinaloy—Zinc sheets. Matthiessen & Hegeler Zinc Co., La Salle, Ill.
Zincgrip—Sheets. Armco Steel Corp., Middletown, O.
Zincilate—Coatings. Industrial Metal Protectives, Inc., Dayton, O.
Zinc Soot—Soot destroyers. Tamms Industries, Inc., Chicago, Ill.
Zinodine—Protective coatings. American Chemical Paint Co., Ambler, Pa.
Zircon—Furnace and refractory cement, refractories. Taylor Sons Co., Charles, Cincinnati, O.
Zone-Master—Heating systems. General Heaters & Regulators Co., East Chicago, Ind.
Zone-Pac—Heating systems. Barber-Colman Co., Rockford, Ill.
Zonetrol—Systems. Acro Mfg. Co., The, Columbus, O.

DIRECTORY SECTION
HEATING, PIPING, AND AIR CONDITIONING EQUIPMENT FOR INDUSTRY AND LARGE BUILDINGS

PART 4 —ALL MANUFACTURERS' ADDRESSES

A

A & A. Register Co., 8327 Clinton Rd., Cleveland 9, O
A'G'A Div. of Elastic Stop Nut Corp. of America, 1027 Newark Ave., Elizabeth 3, N. J.
A-J Mfg. Co., 2119 Washington St., Kansas City 8, Mo.
A-P Controls Corp., 2460 N. 32nd St., Milwaukee 10, Wis.
Abart Gear & Machine Co., 4828-36 W. 16th St., Chicago 50, Ill.
Abbeon Supply Co., 179-15 Jamaica Ave., Jamaica, N. Y.
Abbott & Biddle Co., 2413-27 Federal St., Philadelphia 46, Pa.
Able Metal Spinning & Stamping Co., 126 LaFayette St., New York 13, N. Y.
Acadia Synthetic Products Div., Western Felt Works, 4115 Ogden Ave., Chicago, Ill.
Accurate Sheet Metal Mfg. Works, 2336-40 Milwaukee Ave., Chicago 47, Ill.
Ace Engineering Co., 1435 W. 15th St., Chicago 8, Ill.
Ace Instrument Co., Inc., 172 Pacific St., Brooklyn, N. Y.
Acer & Whedon, Inc., Medina, N. Y.
Acheson Mfg. Co., Braddock P. O., Rankin, Pa.
Acker Organization, Inc., W. M., 3167 Fulton Rd., Cleveland 9, O.
Ackermann Mfg. Co., Wheeling, W. Va.
Acme Asbestos Covering & Flooring Co., 236 N. Elizabeth St., Chicago 7, Ill.
Acme Electric Corp., Cuba, N. Y.
Acme Electric Welder Co., 2618 Fruitland Ave., Los Angeles 58, Calif.
Acme Equipment Co., 205-13 E. Broadway, Muskogee, Okla.
Acme Industries, Inc., Cor. Mechanic St., Jackson, Mich.
Acme Mfg. Co., State Rd. below Rhawn St., Holmesburg, Philadelphia 36, Pa.
Acme Refining Co., The, W. 56th & W. & L. E. Ry., Cleveland, O.
Acme Steel Co., 2840 Archer Ave., Chicago 8, Ill.
Acme White Lead & Color Works, 8250 St. Aubin Ave., Detroit 11, Mich.
Acorn Refining Co., 8001 Franklin Ave., Cleveland, O.
Acragage Corp., Wampus Lane, Milford, Conn.
Acro Mfg. Co., The, 2040 E. Main St., Columbus, O.
Acro Welder Mfg. Co., 1825 W. St. Paul Ave., Milwaukee 3, Wis.
Adam Electric Co., Frank, 3650 Windsor St., St. Louis, Mo.
Adams Co., The, E. 4th St., P. O. Box 268, Dubuque, Ia.
Adams Co., Inc., R. P., 225-7 E. Park Dr., Buffalo 17, N. Y.
Adams Mfg. Co., 1530 St. Clair Ave., Cleveland 14, O.
Adams Pipe Repair Products, 2453 Merced Ave., P. O. Box 21, El Monte, Calif.
Adelta Mfg. Co., Inc., 21 & Ellsworth, Philadelphia 46, Pa.
Adjustable Clamp Co., 417 N. Ashland Ave., Chicago 22, Ill.
Advance Aluminum Castings Corp., 2742 W. 36th Pl., Chicago 32, Ill.
Advance Electric & Relay Co., 2435 N. Naomi St., Burbank, Calif.
Advance Fan & Blower Co., 3428 Bagley, Detroit, Mich.
Advance Pump Co., 2531 9th St., Berkeley, Calif.
Aerco Corp., 214 Lafayette Pl., Englewood, N. J.
Aero-Coupling Corp., 3015 Winona Ave., Burbank, Calif.
Aerofin Corp., 410 S. Geddes St., Syracuse 1, N. Y.
Aeroil Products Co., Inc., Wesley St., South Hackensack, N. J.
Aeroquip Corp., 300 S. East Ave., Jackson, Mich.
Aerotec Corp., The, Greenwich, Conn.
Aerotrol Engineering Co., 4135 Brownsville Rd., Pittsburgh 27, Pa.
Aerovent Fan Co., Inc., Ash and Barlow Sts., Piqua, O.
Agaloy Tubing Co., Springfield, O.
Agava Products, Inc., 34 Exchange Pl., Jersey City 2, N. J.
Aget-Detroit Co., 613 First National Bank Bldg., Ann Arbor, Mich.
Agnew Electric Co., Milford, Mich.
Agnew & Tomlinson, 51-04 Vernon Blvd., Long Island City 1, N. Y.
Ahlberg Bearing Co., 3081 W. 47th St., Chicago 32, Ill.
Air-Aid Corp., 69 Tencan St., Boston, Mass.
Air Conditioning Engineering Co., 44 First St., Cambridge 41, Mass.
Air Conditioning Products Co., 2340 W. Lafayette Blvd., Detroit 16.
Air Control Products, Inc., Coopersville, Mich.
Air Controls, Inc., Div. of Cleveland Heater Co., 2310 Superior Ave., Cleveland 14, O.
Air Conversion Research Corp., 4107 N. Damen Ave., Chicago 18, Ill.
Air-Cooling Engineering Co., P. O. Box 744, Evanston, Ill.
Aircraft Fitting Co., 1400 E. 30 St., Cleveland 14, O.
Air Devices, Inc., 185 Madison Ave., New York 16, N. Y.
Air Equipment Co., 1713 W. Carroll Ave., Chicago 12, Ill.
Air Equipment Co., 2730 Zuni St., Denver, Colo.
Air-Factors, Inc., 1624 S. Raymond Ave., Monrovia, Calif.
Air Filter Corp., 108 N. Water St., Milwaukee 2, Wis.
Air-Line Engineering Co., 198 Wayne St., Mansfield, O.
Air Reduction Sales Co., Div. of Air Reduction Co., Inc., 60 E. 42nd St., New York 17, N. Y.
Air & Refrigeration Corp., 439 Madison Ave., New York 22, N. Y.
Aireactor Corp., 22 E. 40th St., New York 16, N. Y.
Aire-Foile Fan & Blower Co., 2909 Central Ave., Detroit 9, Mich.
Airetool Mfg. Co., S. Center St., Springfield, O.
Airgard Mfg. Co., 362 W. Erie St., Chicago 10, Ill.
Airjet Ventilator Co., 380 Plumosa Dr., Pasadena 10, Calif.
Airkem, Inc., 241 E. 44 St., New York 17, N. Y.
Airmaster Corp., 4317 Ravenswood Ave., Chicago 13, Ill.
Airmatic Valve, Inc., 7317 Associate Ave., Cleveland 9, O.
Air-Maze Corp., 25000 Miles Rd., Cleveland 28, O.
Air-O-Cel Co., 23622 Woodward Ave., Detroit 20, Mich.
Airserco Mfg. Co., Inc., 435 Melwood St., Pittsburgh 13, Pa.
Air-Stream Filter Corp., 2100 Washington Ave., St. Louis 3, Mo.
Airtherm Mfg. Co., 711 S. Spring Ave., St. Louis 10, Mo.
Airwasher Corp., Eaton Rapids, Mich.
Ajax Corp. of America, 2509 Washington Ave., Evansville, Ind.
Ajax Flexible Coupling Co., Westfield, N. Y.
Ajax Furnace Fitting Co., Div. of Cincinnati Sheet Metal & Roofing Co., 216-220 E. Front St., Cincinnati 2, O.
Akron Metallic Gasket Co., 155 N. Union, P. O. Box 911, Akron 9, O.
Alabama Pipe Co., Anniston, Ala.
Aladdin Heating Corp., 1111 West Ave. 137, San Leandro, Calif.
Albert Pipe Supply Co., Berry & N. 13th, Brooklyn, N. Y.
Albertson & Co., Inc., Sioux City 3, Ia.
Alco Valve Co., 861 Kingsland Ave., St. Louis 5, Mo.
Aldrich Co., 105 E. Williams St., Wyoming, Ill.
Aldrich Pump Co., 4 Pine St., Allentown, Pa.
Alert Boiler & Mfg. Co., 9661 Robson, Detroit 27, Mich.
Alexander Bros., 406 N. 3rd, Philadelphia, Pa.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Allan Engineering Co., P. O. Box 1211, Dallas, Tex.
Allcraft Mfg. Co., 27 Hayward St., Cambridge, Mass.
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22. Pa.
Allegheny Valve Co., 349 Pennsylvania Ave. W., Warren, Pa.
Allen-Bradley Co., 1335 S. First St., Milwaukee 4, Wis.
Allen Co., Inc., L. B., 6702 Bryn Mawr Ave., Chicago 31, Ill.
Allen Co., Robert G., P. O. Box 110, Mechanicsville, N. Y.
Allen Mfg. Co., W. D., 566 W. Lake St., Chicago, Ill.
Allen Ventilator Div., Production Planning Co., 704 Woodward, Rochester, Mich.
Alliance Industries, Huntingden Valley, Pa.
Alliance Mfg. Co., Alliance, O.
Allied Control Co., Inc., 2 East End Ave., New York 21, N. Y.
Allied Weld-Craft, Inc., 401 W. South St., Indianapolis 25, Ind.
Allin Mfg. Co., 1153 W. Grand Ave., Chicago 22, Ill.
Allington & Curtis Mfg. Co., 1800 Holland Ave., Saginaw, Mich.
Allis-Chalmers Mfg. Co., 1171 S. 70th St., Milwaukee 1, Wis.
Allis Co., Louis, The, 427 E. Stewart St., Milwaukee 7, Wis.
Alloy Rods Co., Lincoln Highway West, York, Pa.
Alloy Stainless Products Co., Union Blvd., Totowa, N. J.
Alloy Steel Products Co., 1506 W. Elizabeth Ave., Linden, N. J.
Allpax Co., Inc., Mamaroneck, N. Y.
Alpha Metals, Inc., 56 Water St., Jersey City, N. J.
Alpha Plastics, Inc., 14 Northfield Rd., W. Orange, N. J.
Alphil Spot Welding Co., 1058 Pacific St., Brooklyn, N. Y.
Airose Chemical Co., Box 1294, Providence 1, R. I.
Alstrom Corp., 790 E. 176 St., Bronx 60, N. Y.
Alten Foundry & Machine Works, Inc., 226 W. Wheeling St., Lancaster, O.
Alton Mfg. Co., 1112 Ross Ave., Dallas 2, Tex.
Alton Mineral Wool Insulation Co., 2317 Whittemore Pl., St. Louis 4, Mo.
Aluminum Co. of America, Frick Bldg., Pittsburgh, Pa.
Aluminum Wool Div., Carey Electronic Engineering Co., 1880 Clifton Ave., Springfield, O.
Amana Refrigeration, Inc., Amana, Ia.
Amercoat Corp., 4809 Firestone Blvd., South Gate, Calif.
American Agile Corp., Dunham Rd., P. O. Box 168, Bedford, O.
American Air Filter Co., Inc., 373 Central Ave., Louisville 8, Ky.
American Air Filter Co., Inc., Herman Nelson Products, 215 Central Ave., Louisville 8, Ky.
American Blow Pipe Co., 3549 W. Cermak Rd., Chicago 23, Ill.
American Blower Corp., Detroit 32, Mich.
American Brass Co., 414 Meadow St., Waterbury 20, Conn.
American Car & Foundry Co., 30 Church St., New York 8, N. Y.
American Cast Iron Pipe Co., 2930 N. 16th St., Birmingham 2, Ala.
American Chemical Paint Co., Brookside Ave., Ambler, Pa.
American Cladmetals Co., P. O. Box 544, Carnegie, Pa.
American Coal Burner and Wood Stoker Corp., 18 E. Erie St., Chicago 11, Ill.
American Coils Co., 360 Thomas St., Newark 5, N. J.
American Coolair Corp., 3604 Mayflower St., P. O. Box 2300, Jacksonville 3, Fla.
American Cooling Tower Co., 2710 McGee St., Kansas City 8, Mo.

American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York, N. Y.
American District Steam Co., Inc., Bryant St., North Tonawanda, N. Y.
American District Telegraph Co., 155 Sixth Ave., New York, N. Y.
American Engineering Co., Aramingo Ave. and Cumberland St., Philadelphia 25, Pa.
American Felt Co., Glenville, Conn.
American Flange & Mfg. Co., Inc., 30 Rockefeller Plaza, New York 20, N. Y.
American Flexible Coupling Co., 1810 Pittsburgh Ave., Erie, Pa.
American Foundry & Furnace Co., Washington St. at McClun, Bloomington, Ill.
American Furnace Co., 1300 Hampton Ave., St. Louis 10, Mo.
American Gilsonite Co., 248 S. Main St., Salt Lake City, Utah
American Hair & Felt Co., 1828 Merchandise Mart, Chicago 54, Ill.
American Hard Rubber Co., 11 Mercer St., New York 13, N. Y.
American Hydrotherm Corp., 33-70 12th St., Long Island City 6, N. Y.
American Hydrovac, Div. Pitz Foundry Inc., 290 Scholes St., Brooklyn 6, N. Y.
American Implement Co., 2523 Taylor St., Omaha, Neb.
American Injector Co.. 1000 E. McNichols, Detroit 13, Mich.
American Instrument Co., Inc., Silver Spring, Md.
American Insulated Pipe Co., 122 E. 42nd St., New York, N. Y.
American K. A. T. Corp., Garwood, N. J.
American Ladder & Scaffold Co., 5503 N. W. 7th Ave., Miami 38, Fla.
American-Larson Ventilation Co., 1004 Keystone Bank Bldg., Pittsburgh 22, Pa.
American Locomotive Co., Alco Products Div., Dunkirk, N. Y.
American Locomotive Co., Diesel Engine Div., Schenectady, N. Y.
American Machine Products Co., 401 S. Third Ave., Marshalltown, Ia.
American Machine Wks., Inc., Racine, Wis.
American Manganese Bronze Co., Rhawn & Hegerman Sts., Philadelphia, Pa.
American-Marietta Co., 101 E. Ontario St., Chicago 11, Ill.
American-Marsh Pumps, Inc., 60 Capital Ave., N. E., Battle Creek, Mich.
American Metal Hose Branch, American Brass Co., The, 698 S. Main St., Waterbury 20, Conn.
American Meter Co., Inc., 1513 Race St., Philadelphia 2, Pa.
American Moistening Co., 260 W. Exchange St., Providence, R. I.
American Nickeloid Co., 113 Second St., Peru, Ill.
American Photocopy Equipment Co., 2849 N. Clark St., Chicago 14.
American Pipe Bending Machine Co., Inc., 17 Furnace St., Poultney, Vt.
American Pipe & Steel Corp., 2201 W. Commonwealth Ave., Alhambra, Calif.
American Pipe Tool Co.. 4856 W. Kinzie St., Chicago 44, Ill
American Platinum Wks., 231 New Jersey Railroad Ave., Newark, N. J.
American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29.
American Radiator & Standard Sanitary Corp., P. O. Box 1226, Pittsburgh 30, Pa.
American Sand-Banum Co., Inc., 9 Rockefeller Plaza, New York 20, N. Y.
American Screw Co., Willimantic, Conn.
American Sheet Metal Works, 331 N. Alexander, New Orleans, La
American Shipbuilding Co., Ft. W. 54th St., Cleveland 2, O.
American Solder & Flux Co., 2152 E. Norris St., Philadelphia 25, Pa.
American Steel Band Co., P. O. Box 565, Pittsburgh, Pa.
American Steel & Wire Div., United States Steel, Rockefeller Bldg., Cleveland 13, O.
American Thermal Industries, Inc., 440 Illinois, Detroit 1, Mich.
American Warming & Ventilating Co., 1017-1021 Summit St., Toledo 4, O.
American Water Softener Co., Lehigh Ave. and 4th St., Philadelphia 33, Pa.
American Well Wks., 100 N. Broadway, Aurora, Ill.
American Wheelabrator & Equipment Corp., 904 S. Byrkit St., Mishawaka, Ind.
American Zinc Products Div., Ball Brothers Co., Greencastle, Ind.
Ames Iron Works, Inc., Oswego, N. Y.
Aminco Refrigeration Products Co., 1000 E. McNichols, Detroit 3, Mich.
Ammco Tools, Inc., North Chicago, Ill.
Ammerman Co., C. L., 104 N. 2nd St., Minneapolis, Minn.
Amp Corp., 2921 Locust St., St. Louis, Mo.
Ampco Metal, Inc., Milwaukee 47, Wis.
Ampion Corp., 4-88 47th Ave., Long Island City 1, N. Y.
Analytical Measurements, Inc., 585 Main St., Chatham, N. J.
Anchor Div., Stratton & Terstegge Co., Inc., P. O. Box 311, New Albany, Ind.
Anchor Packing Co., 401 N. Broad St., Philadelphia 8, Pa.
Andale Co., 1740 Cherry St., Philadelphia 3, Pa.
Andersen Corp., Bayport, Minn.
Anderson Co., V. D., The, 1949 W. 96th St., Cleveland 2, O.
Anderson Diesel Engine Co., 6245 State Rd., Philadelphia 35, Pa.
Anderson Products, Inc., 17 Tudor St., Cambridge 39, Mass.
Anderson-Stolz Corp., 1731 Walnut St., Kansas City 8, Mo.
Anemostat Corp. of America, 10 E. 39th St., New York 16, N. Y.
Anetsberger Bros., Inc., Northbrook, Ill.
Annis Air Filter Div., Royal Heaters, Inc., 1024 Westminster Ave., Alhambra, Calif.
Ansul Chemical Co., Refrigeration Div., Marinette, Wis.
Anti-Friction Bearings Co., 2020 S. Figueroa St., Los Angeles 7, Calif.
Apex All Weather Products, Engineering Div., 228 N. La Salle St., Chicago 1, Ill.
Apollo Steel Co., 609 Warren Ave., Apollo, Pa.
Applied Mechanics Co., 167 Oliver St., Boston 10, Mass.
April Showers Co., Inc., 4126 Eighth St., N.W., Washington 11, D. C.
Aqua Electric Scale Control, Inc., 2028 E. 22nd St., Cleveland 15, O.
Aqua-Mist Co., 426 Jefferson St., Topeka, Kans.
Aqua-Therm, Inc.. 39 N. Torrence St., Dayton, O.
Aquatrol Laboratories, Inc., Clifton, N. J.
Arabol Mfg. Co., 110 E. 42nd St., New York 17, N. Y.
Arcee Products, Pawtucket, R. I.
Arco Co., The, 7301 Bessemer Ave., Cleveland 27, O.
Arcos Corp., 1500 S. 50th St., Philadelphia 43, Pa.
Arcweld Mfg. Co., Inc., 3469 Third Ave., W., Seattle 99, Wash.
Ardee Mfg. Co., Inc., 840 N. Seward St., Los Angeles 38, Calif.
Arens Controls, Inc., 2017 Greenleaf St., Evanston, Ill.
Arex Co., 612 N. Michigan Ave., Chicago 11, Ill.
Arjac Products Inc., 55-59 Halstead St., Rochester 10, N. Y.
Armart Mfg. Co., 164 Wahconah St., Pittsfield, Mass.
Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Armco Steel Corp., 703 Curtis St., Middletown, Ohio.
Armite Laboratories, 6609 Broad St., Los Angeles 1, Calif.
Armor Electric Co., 1020 Holland St., Erie, Pa.
Armour and Co., Ammonia Div., 1355 W. 31st St., Chicago 9, Ill.
Armstrong Bros. Tool Co., 5200-5300 W. Armstrong Ave., Chicago 30, Ill.
Armstrong Co., The, 241 S. Post St., Detroit 17, Mich.
Armstrong Co., Richard M., Westchester, Pa.
Armstrong Cork Co., 4400 Concord St., Lancaster, Pa.
Armstrong Machine Wks., 874 Maple St., Three Rivers, Mich.
Arrow-Hart & Hegeman Elect. Co., 103 Hawthorne St., Hartford 6, Conn.
Arrowhead Rubber Co., 2300 Curry St., Long Beach, Calif.
Art Valve Co., 4662 N. Lincoln Ave., Chicago 25, Ill.
Artkraft Mfg. Co., Lima, O.
Asbestos Asphalt Insulation Co., 2100 W. Fullerton Ave., Chicago 47.
Ashburn Supply Co., 8468 Warner Dr., Culver City, Calif.
Ashcraft Co., J. P., 5643 Dyer St., Dallas 6, Tex.
Ashton Valve Co., 43 Kendrick St., Wrentham, Mass.
Askania Regulator Co., 240 E. Ontario St., Chicago 11, Ill.
Associated Mills, 303 W. Monroe St., Chicago, Ill.
Associated Valve & Engineering Co., 1150 W. Marquette Rd., Chicago, Ill.
Aston Products, Inc., 22804 Dequindre, Hazel Park, Mich.
Atkins Saw Div., Borg-Warner Corp., 402 S. Illinois St., Indianapolis 9, Ind.
Atkomatic Valve Co., 545 W. Abbott St., Indianapolis, Ind.
Atlantic Metal Hose Co., Inc., 123 W. 64th St., New York 23, N. Y.
Atlantic Pipe Bending & Fabricating Corp., Route 17 near Moonachie Ave., P. O. Box 157, Wood-Ridge, N. J.
Atlantic Steel Co., P. O. Box 1714, Atlanta 1, Ga.
Atlantic Steel Boiler Co., S. E. Cor. 22nd & Washington Ave., Philadelphia 46, Pa.
Atlas Chemical Co., Marietta, O.
Atlas Mfg. Co., Eustis at Robbins St., St. Paul 4, Minn.
Atlas Powder Co., Industrial Finishes Dept., North Chicago, Ill.
Atlas Valve Co., 282 South St., Newark, N. J.
Atlas Welding Accessories Co., 707 E. Lewiston Ave., Ferndale 20, Mich.
Auburn Burner Co., Lock Box 269, Auburn, Ind.
Auburn Foundry Inc., Stoker Div., Auburn, Ind.
Auer Register Co., 6600 Clement Ave., Cleveland 5, O.
Aurora Pump Co., 619 Loucks St., Aurora, Ill.
Austin Corp., Robert, 51 Albany St., Boston 11, Mass.
Au-Temp-Co Corp., 657 Broadway, New York 12, N. Y.
Automatic Control Co., 995 University Ave., St. Paul 4, Minn.
Automatic Devices Co., Inc., 714 Hillgrove Ave., Western Springs, Ill.
Automatic Electric Mfg. Co., 10 State St., Mankato, Minn.
Automatic Firing Corp., 4417 Oleatha Ave., St. Louis 16, Mo.
Automatic Gas Equipment Co., 301 Brushton Ave., Pittsburgh 21, Pa.
Automatic Switch Co., 391 Lakeside Ave., Orange, N. J.
Automatic Temperature Control Co., Inc., 5212 Pulaski Ave., Philadelphia 44, Pa.
Autorad Inc., 3535 Fillmore St., Chicago 24, Ill.
Autostributor Co., 226 Leslie St., Lansing 12, Mich.
Avon Tube Div., Higbe Mfg. Co., Ewing Rd., Rochester, Mich.

B

B/W Controller Corp., 2200 E. Maple Ave., Birmingham, Mich.
Babbitt Chemical Specialties Co., 36 Prospect St., New Bedford, Mass.
Babbitt Steam Specialty Co., 1 Babbitt Sq., New Bedford, Mass.
Babcock & Wilcox Co., 161 E. 42nd St., New York 17, N. Y.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Babcock & Wilcox Co., Tubular Products Div., Keystone Plant, Alliance, O.
Bacharach Industrial Instrument Co., 7301 Penn Ave., Pittsburgh 8.
Bache & Co., Semon, Greenwich & Morton Sts., New York 14, N. Y.
Badger Fire Extinguisher Co., 624 Somerville Ave., Somerville 43 Mass.
Badger Mfg. Co., 230 Bent St., Cambridge 41, Mass.
Badger Sales Co., Inc., 2251 W. Pico Blvd., Los Angeles 6, Calif.
Badham Insulation Co., Inc., Birmingham, Ala.
Baer Bros., 438 W. 37th St., New York 18, N. Y.
Bahnson Co., 1001 S. Marshall St., Winston-Salem, N. C.
Bailey Co., Chas. M., 667 Folsom St., San Francisco 7, Calif.
Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10, O.
Baker & Co., Inc., 113 Astor St., Newark 5, N. J.
Baker Mfg. Co., Evansville, Wis.
Bakeraire Corp., 1508 Evans St., South Windham, Me.
Bal-Air, Inc., 1210 McGarock St., Nashville, Tenn.
Baldor Electric Co., 4353 Duncan Ave., St. Louis 10, Mo.
Baldwin Belting, Inc., 74-76 Murray St., New York 7, N. Y.
Baldwin-Hill Co., 596 Breunig Ave., Trenton 2, N. J.

Baldwin-Lima-Hamilton Corp., Philadelphia 42, Pa.
Balloffet Nozzle Co., Inc., 6825 Adams St., Guttenberg, N. J.
Balmar Corp., Woodberry, Baltimore 11, Md.
Baltimore Aircoil Co., Inc., 2615-2635 Mathews St., Baltimore 18, Md.
Banister Co., Inc., 23 Charles St., Cambridge 41, Mass.
Bar-Brook Mfg. Co., Inc., 6133 Linwood Ave., Shreveport, La.
Barber-Colman Co., 1228 Rock St., Rockford, Ill.
Barber Gas Burner Co., 3704 Superior Ave., Cleveland 14, O.
Barclay, Inc., Robert, 1236 W. Fulton St., Chicago 7, Ill.
Barco Mfg. Co., 1801 Winnemac Ave., Chicago 40, Ill.
Bard Mfg. Co., Bryan, O.
Barkow Mfg. Co., Inc., Aug. G., 2230 South 43rd St., Milwaukee 15, Wis.
Barksdale Valves, 4905 Santa Fe Ave., Los Angeles 58, Calif.
Barnes Co., A. D., 516 Linden Ave., Dayton 3, O.
Barnes & Jones, Inc., 128 Brookside Ave., Jamaica Plain, Boston 36 Mass.
Barnes Manufacturing Co., Mansfield, O.
Barnes Tool Co., The, 152 Brewery St., New Haven 6, Conn.
Barreled Sunlight Paint Co., 43 Dudley St., Providence 1, R. I.
Barrett Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.
Barrett, Haentjens & Co., Hazleton, Pa.
Barrett Machine Co., 912-916 Behan St., N. S., Pittsburgh 12, Pa.
Barry Corp., 765 Pleasant St., Watertown 72, Mass.
Barry Blower Co., 3100 California St., N.E., Minneapolis, Minn.
Bart Mfg. Corp., 227 Main St., Belleville 9, N. J.
Barth Engineering & Mfg. Co., Inc., Milldale, Conn.
Bartlett Mfg. Co., 3003 E. Grand Blvd., Detroit 2, Mich.
Barton Co., 719 Hennepin, Minneapolis, Minn.
Barton Instrument Corp., 1429 S. Eastern Ave., Los Angeles 22, Calif
Barton Products, Inc., 819 N. Blanchard, Wheaton, Ill.
Barwick Mfg. Corp., 317 E. 18th, Wichita, Kan.
Baseline Mfg. Co., 2701 E. 78th St., Minneapolis 23, Minn.
Basic Refractories, Inc., 845 Hanna Bldg., Cleveland 15, O.
Bastian-Morley Co., Inc., LaPorte, Ind.
Bath Co., Cyril, The, E. 70th and Machinery Ave., Cleveland 3, O
Bausch & Lomb Optical Co., 633 St. Paul St., Rochester 2, N. Y.
Bayer Co., 4030 Chouteau Ave.. St. Louis 10, Mo.
Bayley Blower Co., 1817 S. 66th St., Milwaukee 14, Wis.
Beach-Russ Co., 64A Church St., New York 7, N. Y.
Beacon-Morris Corp., 60 Brainerd Rd., Allston, Boston 34, Mass.
Bear Mfg. Co., Industrial Div., 2030 5th Ave., Rock Island, Ill.
Bearings Co. of America, 501 Harrisburg Ave., Lancaster, Pa.
Beaton & Cadwell Mfg. Co., 185 Main St., New Britain, Conn.
Beaton & Corbin Mfg. Co., Southington, Conn.
Beaver Art Metal Corp., Ellwood City, Pa.
Beaver Pipe Tools, Inc., 310 Dana Ave., Warren, O.
Beck Engineering Combustion Kompany, 2100 Cole St., St. Louis 6.
Beck Mfg. Co., 315 W. Main St., New Albany, Ind.
Beckett Corp., R. W., Elyria, O.
Beckett & Co., Inc., Thomas, 2521 Willowbrook Rd., P. O. Box 7354, Dallas 9, Tex.
Beckley Perforating Co., 301 North Ave., Garwood, N. J.
Beckman & Whitley, Inc., 958 San Carlos Ave., San Carlos, Calif.
Belco Industrial Equipment Div., 100 Pennsylvania Ave., Paterson 3, N. J.
Belgian Electric Sales Corp., 40 E. 49th St., New York 17, N. Y.
Belknap Mfg. Co., 800 Union Ave., Bridgeport 1, Conn.
Bell & Gossett Co., 8200 N. Austin Ave., Morton Grove, Ill.
Bellows Co., The, 230 W. Market St., Akron 9, O.
Belmont Packing & Rubber Co., The, Butler & Sepviva Sts., Philadelphia 37, Pa.
Belmont Smelting & Refining Wks., Inc., 349 Belmont Ave., Brooklyn 7, N. Y.
Belter Electric Mfg. Co., G. J., The, 3830-32 Olive St., St. Louis 8.
Benjamin Air Rifle Co., 1527 S. 8th St., St. Louis 4, Mo.
Benjamin Electric Mfg. Co., Des Plaines, Ill.
Bennett Oil Co., 964 S. Saddle Creek Rd., Omaha 6, Neb.
Benson Co., Inc., Alex R., 1040 Bay Rd., So., Hudson, N. Y.
Bergen Pipesupport Corp., 50 Church St., New York 7, N. Y.
Berger Bros. Co., 229-237 Arch St., Philadelphia 6, Pa.
Berger Mfg. Div., Republic Steel Corp., 1038 Belden Ave., Canton 5, O.
Berko Electric Mfg. Co., 212-40 Jamaica Ave., Queens Village 28, N. Y.
Berns Mfg. Corp., 3050 N. Rockwell St., Chicago, Ill.
Bernz Co., Otto, 280 Lyell Ave., Rochester 6, N. Y.
Bertram Co., Harvey P., The, 1008 W. 9th St., Cincinnati 3, O.
Bertsch & Co., Inc., Church St., Cambridge City, Ind.
Best Combustion Equipment Co., Inc., W. N., 415 11th St., Carlstadt. N. J.
Best Register Co., 2005 W. Oklahoma Ave., Milwaukee 15, Wis
Bete Fog Nozzle Inc., 309 Well St., Greenfield, Mass.
Bethlehem Steel Co., Bethlehem, Pa.
Betz Corp., 445 State St., Hammond, Ind.
Beverly Shear Mfg. Co., 3019 W. 111th St., Chicago 43, Ill.
Bica Co., 1170 N. State St., Girard, O.
Biersach & Niedermeyer Co., 1937 N. Hubbard St., Milwaukee 12.
Bigelow Co., The, 174 River St., New Haven 3, Conn.
Bigelow Liptak Corp., 2550 W. Grand Blvd., Detroit 8, Mich.
Biggs Boiler Wks. Co., The, 1007 Bank St., E. Akron 5, O.
Bignall & Keeler Div., John Ramming Machine Co., 4591 McRee Ave., St. Louis 10, Mo.
Billings & Spencer Co., 1 Laurel St., Hartford 1, Conn.
Binks Mfg. Co., 3114-40 Carroll Ave., Chicago 12, Ill.
Birchfield Boiler, Inc., 2503 E. 11th St., Tacoma 1, Wash.
Bird-Archer Co., 4337 North American St., Philadelphia 40, Pa.
Birdsell Mfg. Co., Inc., 750 San Antonio Rd., Palo Alto, Calif.
Birks Mfg. Co., 811 Hanover Rd., Meriden, Conn.
Bishop & Babcock Mfg. Co., 4901 Hamilton Ave., Cleveland 14, O.
Bituminous Coal Institute, Southern Bldg., Washington 5, D. C.
Black & Decker Mfg. Co., 628 Pennsylvania Ave., Towson 4, Md.
Black Magic Products Co., P. O. Box 1703, Tulsa, Okla.
Black Mfg. Co., The, 201 Second St., Harrison, N. J.
Black-Sivalls & Bryson, Inc., 7500 E. 12th St., Kansas City 26, Mo.
Black & White Chemical Co., 130 Walnut Ave., New York 54, N. Y.
Blackhawk Mfg. Co., 5325 W. Rogers St., Milwaukee 1, Wis.
Blackmer Pump Co., 1920A Century Ave., S. W., Grand Rapids 9.
Blaisdell Compressor Co., 227 Fulton St., New York, N. Y.
Blaw Knox Co., Power Piping and Sprinkler Div., 829 Beaver Ave., Pittsburgh 33, Pa.
Blazer, M., & Son, 173 Market St., Passaic, N. J.
Bliss Co., E. W., 1375 Raff Rd., S. W., Canton, O.
Blissfield Mfg. Co., Blissfield, Mich.
Blokolgas System, Inc., 70 W. Alexandrine, Detroit 1, Mich.
Blood Brothers Machine Div., Rockwell Spring and Axle Co., Allegan, Mich.
Blower Application Co., 3165 N. 30th St., Milwaukee 16, Wis.
Blue Ridge Talc Co., Inc., Henry, Va.
Blue Seal Chemical Co., 177 Westfield Ave., W., Roselle Park, N. J.
Bock Corp., 110 S. Dickinson St., Madison, Wis.
Bodine Electric Co., 2254 W. Ohio St., Chicago 12, Ill.
Boiler Engineering & Supply Co., Manavon Rd., Phoenixville, Pa.
Bolta Products, Inc., Lawrence, Mass.
Bonafide Genasco, Inc., 295 Fifth Ave., New York 16, N. Y.
Bonney Forge & Tool Wks., 715 Meadow St., Allentown, Pa.
Bordo Co., Inc., L. J., 115 New St., Glenside, Pa.
Borg-Erickson Corp., 469 E. Ohio St., Chicago 11, Ill.
Borm Mfg. Co., 23 N. Union St., Elgin, Ill.
Boston Auto Gage Co., 70 West St., Pittsfield, Mass.
Boston Gear Works, Quincy 71, Mass.
Boston Machine Works Co., 7 Willow St., Lynn, Mass.
Boston Woven Hose & Rubber Co., 29 Hampshire St., Cambridge, Mass.
Botfield Refractories Co., Swanson & Clymer Sts., Philadelphia 47, Pa.
Bowen Engineering, Inc., North Branch, N. J.
Bowerston Shale Co., The, Bowerston, O.
Bowser, Inc., 1302 E. Creighton Ave., Fort Wayne 2, Ind.
Boylston Steam Specialty Co., 116-122 W. Illinois St., Chicago, Ill.
Brabender Corp., Rochelle Park, N. J.
Brady Co., W. H., 727 W. Glendale Ave., Milwaukee 12, Wis.
Breidert Co., G. C., 3129 San Fernando Rd., Los Angeles 65, Calif.
Bremil Mfg. Co., 1204 Pittsburgh Ave., Erie, Pa.
Bridgeport Brass Co., 30 Grand St., Bridgeport 2, Conn.
Bridgeport Thermostat Div., Robertshaw-Fulton Controls Co., Connecticut Ave., Bridgeport 1, Conn.
Brighton-Dickinson Div., 3174 S. Archer, Chicago 8, Ill.
Bristol Co., The, P. O. Box 1790, Waterbury 20, Conn.
Broan Mfg. Co., Inc., 1669 N. Water St., Milwaukee 2, Wis.
Brockway Co., 361 Church St., Naugatuck, Conn.
Bronson Fan Mfg. Co., 1237 Riverside Dr., Los Angeles 31, Calif.
Bronze Bearings, Inc., 340 North Ave., E. Cranford, N. J.
Brook Motor Corp., 3557 W. Peterson Ave., Chicago 45, Ill.
Brooke Engineering Co., Inc., 4517 Wayne Ave., Philadelphia 44, Pa.
Brookfield Engineering Laboratories, Inc., 2 Porter St., Stoughton, Mass.
Brooklyn Varnish Mfg. Co., 50 Jay St., Brooklyn 1, N. Y.
Brooks Equipment Corp., 217 Hudson St., Hoboken, N. J.
Bros Boiler & Mfg. Co., Wm., 1057 10th Ave., S. E., Minneapolis 14
Brown Co., 150 Causeway St., Boston, Mass.
Brown-Brockmeyer Co., Inc., P. O. Box 989, Dayton 1, O.
Brown-Electro Co., 17 N. Dewey, Oklahoma City 2, Okla.
Brown Fintube Co., The, Elyria, O.
Brown Products Co., 97-12 Metropolitan Ave., Forest Hills, N. Y.
Browning Mfg. Co., Inc., 1940 Browning Blvd., Maysville, Ky.
Brundage Co., The, 503 N. Park St., Kalamazoo 11, Mich.
Bruner Corp., 2318 N. 30th St., Milwaukee, Wis.
Bruning Co., Inc., Charles, 4700 Montrose Ave., Chicago 41, Ill.
Brunner Mfg. Co., 1821 Broad St., Utica 1, N. Y.
Bryan Steam Corp., P. O. Box 337, Peru, Ind.
Bryant Corp., C. L., 2720 E. 79th St., Cleveland 4, O.
Bryant Heater Div., Affiliated Gas Equipment Co., Inc., 17825 St. Clair Ave., Cleveland 10, O.
Bubar, Dust Systems, Inc., Old Lyme, Conn.
Buckeye Furnace Pipe Co., Columbus 8, O.
Buckeye Tools Corp., 29 W. Apple St., Dayton 1, O.
Buda Co., Harvey, Ill.
Buensod-Stacey, Inc., 60 E. 42nd St., New York 17, N. Y.
Buffalo Bolt Co., Div. of Buffalo-Eclipse Corp., North Tonawanda, N. Y.
Buffalo Forge Co., 171 Mortimer St., Buffalo 5, N. Y.
Buffalo Meter Co., 2917 Main St., Buffalo 14, N. Y.
Buffalo Pumps, Inc., 171 Mortimer St., Buffalo 5, N. Y.
Buffalo Tank Corp., 744 Broad St., Newark 2, N. J.
Buflovak Equipment Div. of Blaw-Knox Co., 50 Winchester Ave., Buffalo 11, N. Y.
Builders-Providence, Inc., Div. of Builders Iron Foundry, 345 Harris Ave., Providence 1, R. I.
Bullard Co., The, Bridgeport 2, Conn.
Bump Pump Co., La Crosse, Wis.
Bundy Tubing Co., 8109 E. Jefferson Ave., Detroit 14, Mich.
Burden Co., Alan E., 3352 Motor Ave., Los Angeles 34, Calif.
Burdette Mfg. Co., 3433 W. Madison St., Chicago 24, Ill.
Burgess-Manning Co., Architectural Products Div., 5970 Northwest Highway, Chicago 31, Ill.
Burke Electric Co., Div. of Marathon Electric Mfg. Corp., 1201 W. 12th St., Erie, Pa.
Burling Instrument Co., Air Conditioning Div., 5 Vose Ave., South Orange, N. J.

Burnham Corp., Boiler Div., Main St., Irvington, N. Y.
Burnley Battery & Mfg. Co., 103 Clay St., North East, Pa.
Burrows Mfg. Co., F. A., 318 E. Poplar St., York, Pa.
Burt Mfg. Co., 41 E. South St., Akron 11, O.
Bury Compressor Co., 18th & Cascade Sts., Erie, Pa.
Bush Mfg. Co., 179 South St., West Hartford 10, Conn.
Byers Co., A. M., Clark Bldg., Pittsburgh 22, Pa.
Byron Jackson Co., P. O. Box 2017, Terminal Annex, Los Angeles 54, Calif.

C

C C Pump Mfg. Div., Market-Madison Sts., Palmyra, N. J.
CCA Products, Inc., P. O. Box 671, Glendale 5, Calif.
C & H Air Conditioning Fan Co., Inc., 1603 DeKalb Ave., N. E., Atlanta 6, Ga.
Cabot, Inc., Samuel, 141 Milk St., Boston 9, Mass.
Calbar Paint & Varnish Co., 2612-26 N. Martha St., Philadelphia 25.
Calculator Specialties Co., 122 S. Michigan Ave., Chicago 3, Ill.
Caldwell Co., W. E., 2120 Brook St., Louisville, Ky.
Calgon, Inc., Hagan Bldg., Pittsburgh 30, Pa.
California Brass Mfg. Co., 1447 Naud St., Los Angeles 12, Calif.
Callahan Can Machine Co., Inc., 80 Richard St., Brooklyn, N. Y.
Cambridge Corp., 350 S. Geddes St., Syracuse, N. Y.
Camco Products Inc., 445 State St., North Haven, Conn.
Camloc Fastener Corp., 22 Spring Valley Rd., Paramus, N. J.
Campbell Co., J. A., 645 E. Wardlaw Rd., Long Beach 7, Calif.
Campbell Heating Co., 3121 Dean Ave., Des Moines 17, Ia.
Campbell Co., E. K., Manchester at 18th, Kansas City 26, Mo.
Cam-Stat, Inc., Div. of The Paul Henry Co., 11833 West Olympic Blvd., Los Angeles 64, Calif.
Cannon Chemical Co., Inc., 181 Portland St., Cambridge 41, Mass.
Canton Stoker Corp., 2400 Andrew Place, S. W., Canton 1, O.
Canvas Products Co., 2115 Locust St., St. Louis 3, Mo.
Capewell Mfg. Co., 60 Govenor St., Hartford 2, Conn.
Capitol Machine Works, 424 7th St., Oakland, Calif.
Capitol Mfg. & Supply Co., 153 W. Fulton St., Columbus, O.
Carbide and Carbon Chemicals Co., A Div. of Union Carbide and Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Carboloy Div. of General Electric Co., 11177 E. 8 Mile Rd., Detroit, Mich.
Cardox Corp., 307 N. Michigan Ave., Chicago, Ill.
Carey Electronic Engineering Co., Metal Wool Div., 1880 Clifton Ave., Springfield, O.
Carey Mfg. Co., Philip, Wayne Ave., Lockland, Cincinnati 15, O.
Cargocaire Engineering Corp., 15 Park Row, New York 38, N. Y.
Carling Turbine Blower Co., 25 St. John's Rd., Worcester 3, Mass.
Carlon Products Corp., 10225 Meech Ave., Cleveland 5, O.
Carlson & Sullivan, 1617 California St., Monrovia, Calif.
Carnes, Inc., John R., Greenlawn Ave. & Erie R. R., Lima, O.
Carnes Co., W. R., Verona, Wis.
Carney Co., Inc., The, Mankato, Minn.
Carolina Aniline & Extract Co., 301 S. Cedar St., Charlotte, N. C.
Carolina Blower Co., Inc., 430 Morehead Ave., Greensboro, N. C.
Carpenter Heating & Stoker Co., 2135 St. Clair Ave., Cleveland 14, O.
Carpenter Mfg. Corp., The, 6723 Denison Ave., Cleveland 2, O.
Carpenter & Paterson, Inc., 1190 Bennington St., East Boston 2, Mass.
Carpenter Steel Co., Alloy Tube Div., Union, N. J.
Carrier Corp., 300 S. Geddes St., Syracuse 1, N. Y.
Carty & Moore Engineering Co., 1150 W. Baltimore Ave., Detroit 26, Mich.
Carvell Heat Equipment Co., 1217 Temple St., Los Angeles 26, Calif.
Carver Pump Co., 1460 Hershey Ave., Muscatine, Ia.
Case & Son Mfg. Co., W. A., 33 Main St., Buffalo 3, N. Y.
Cash Co., A. W., P. O. Box 551, Decatur, Ill.
Cash Valve Mfg. Corp., A. W., 6621 E. Wabash Ave., Decatur, Ill.
Cashin Co., W. D., 69 A. St., Boston 27, Mass.
Catawissa Valve & Fittings Co., Catawissa, Pa.
Catskill Metal Works, Inc., Catskill, N. Y.
Cauhorn Distributing Co., 9999 Broadstreet, Detroit 4, Mich.
Celco Corp., 110 E. 42nd St., New York 17, N. Y.
Celotex Corp., The, 120 S. La Salle St., Chicago 3, Ill.
Cement Lined Pipe Co., 93 Brookline St., Lynn, Mass.
Central Brass Mfg. Co., 2950 E. 55th St., Cleveland 4, O.
Central Die Casting & Mfg. Co., Inc., 2935 W. 47th St., Chicago, Ill.
Central Foundry Co., Murray & Pacific Sts., Newark 5, N. J.
Central Rubber & Steel Corp., P. O. Box 420, Findlay, O.
Central States Mfg. Co., Inc., 1200-12 Summit St., Arkansas City, Kan.
Central States Steel Boiler Co., 4649 W. Harrison St., Chicago 44, Ill.
Central Station Steam Co., 2920 E. Woodbridge St., Detroit 7, Mich.
Central Wire & Iron Works, 621 E. Locust St., Des Moines, Ia.
Centrifix Corp., 3608 Payne Ave., Cleveland 14, O.
Centri-Spray Corp., 14290 Meyers Rd., Detroit 27, Mich.
Century Electric Co., 1806 Pine St., St. Louis 3, Mo.
Century Engineering Corp., 401-431 3rd St., S. E., Cedar Rapids, Ia.
Century Fan & Ventilator Co., 41 Cedar St., Stamford, Conn.
Certain-teed Products Corp., 120 E. Lancaster Ave., Ardmore, Pa.
Certified Flexible Couplings, 341 East 233rd St., New York 70, N. Y.
Chace Co., W. M., 1606 Beard Ave., Detroit 9, Mich.
Chain Belt Co., 4617 W. Greenfield, Milwaukee 1, Wis.
Chamberlin Co. of America, 1254 La Brosse St., Detroit 32, Mich.
Champion Blower & Forge Co., Harrisburg Ave. and Charlotte St., Lancaster, Pa.
Champion Furnace Pipe Co., 215 Eaton St., Peoria 3, Ill.
Champion Laboratories, Inc., Meriden, Conn.
Champion Machine & Forging Co., 3695 E. 78th St., Cleveland 5, O.
Chaplin-Fulton Mfg. Co., 5800 Grand Ave., Pittsburgh 25, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Char-Gale Mfg. Co., 4325 Hiawatha Ave., Minneapolis 6, Minn.
Chase Brass & Copper Co., 236 Grand St., Waterbury 20, Conn.
Chase-Shawmut Co., Newburyport, Mass.
Chelsea Fan & Blower Co., Inc., 639 South Ave., Plainfield, N. J.
Chelsea Metal Stamping Co., 95 8th Ave., New York 11, N. Y.
Chemalloy Associates, Santee, Calif.
Chemical Engineering Co., 2800 Logan St., P. O. Box 1076, Dallas 1.
Chemical & Metallurgical Products, Inc., 74 Washington St., New York, N. Y.
Chemical Solvent Co., 3005 N. 16th St., Birmingham, Ala.
Chempump Corp., 1300 E. Mermaid Lane, Philadelphia 18, Pa.
Cheney Flashing Co., 623 Prospect St., Trenton 5, N. J.
Chester Cable Corp., Chester, N. Y.
Chesterton Co., A. W., 6 Ashland St., Everett 49, Mass.
Chicago Belting Co., 113-125 N. Green St., Chicago 7, Ill.
Chicago Blower Corp., 9867 Pacific Ave., Franklin Park, Ill.
Chicago Bridge & Iron Co., 332 S. Michigan Ave., Chicago 4, Ill.
Chicago Die Casting Mfg. Co., 2510-14 W. Monroe St., Chicago 12, Ill.
Chicago Expansion Bolt Co., 1338 W. Concord Pl., Chicago 22, Ill.
Chicago Fire Brick Co., 1467 N. Elston Ave., Chicago 22, Ill.
Chicago Float Works, Not Inc., Dept. T., 2330 S. Western Ave., Chicago 8, Ill.
Chicago Forging and Mfg. Co., 2000 Southport Ave., Chicago 14, Ill.
Chicago Furnace Supply Co., 1278 Clybourn Ave., Chicago, Ill.
Chicago Gasket Co., 1275 West North Ave., Chicago 22, Ill.
Chicago Metal Mfg. Co., 3724 S. Rockwell St., Chicago 32, Ill.
Chicago Nipple Mfg. Co., 1616 S. Laramie Ave., Cicero 50, Ill.
Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y.
Chicago Pump Co., 622 Diversey Pkwy., Chicago 14, Ill.
Chicago Specialty Mfg. Co., 2954 Lawrence Ave., Chicago 25, Ill.
Chicago Steel Furnace Co., 9326 S. Anthony Ave., Chicago 17, Ill.
Chicago Steel Tank Co., 6400 W. 66th, Chicago 38, Ill.
Chicago-Wilcox Mfg. Co., E. 77th St. and Anthony Ave., Chicago, Ill.
Chiksan Co., Brea, Calif.
Childers Mfg. Co., 3620 W. 11th St., Houston 8, Tex.
Chisholm-Moore Hoist Div., Columbus McKinnon Chain Corp., Tonawanda, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., 1600 Webster St., Dayton 1, O.
Churchward Welding Accessories, Jack, North Haven, Conn.
Cincinnati Electrical Tool Co., The, 2684 Madison Rd., Cincinnati 8, O.
Cincinnati Metalcrafts Inc., 5000 Brotherton Rd., Cincinnati 9, O.
Cincinnati Shaper Co., Hopple, Garrard and Elam, Cincinnati 25, O.
Cinder Products Corp., 75 Ellenfield St., Providence, R. I.
Circulators & Devices Mfg. Corp., 128-168 Thirty-Second St., Brooklyn 32, N. Y.
Cissell Mfg. Co., Inc., W. M., 831 S. First St., P. O. Box 1143, Louisville 1, Ky.
Clarage Fan Co., Porter St., Kalamazoo 16, Mich.
Clark Bros. Co., Inc., Div. of Dresser Industries, 600 Lincoln St., Orlean, N. Y.
Clark Bros. Bolt Co., Milldale, Conn.
Clark Bros. Mfg. Co., Hillsboro, Ore.
Clark Controller Co., 1146 E. 152nd St., Cleveland 10, O.
Clark Dust Control Co., 210 N. Mozart St., Chicago, Ill.
Clark Electric Co., Jas., Jr., 615 Bergman St., Louisville 3, Ky.
Clark Mfg. Co., 1830 E. 38th St., Cleveland 14, O.
Claronex Products, Inc., 239 Java St., Brooklyn 22, N. Y.
Cla-Val Co., P. O. Box 949, Alhambra, Calif.
Clay Equipment Corp., Cedar Falls, Ia.
Claymont Steel Corp., Div. of Colorado Fuel & Iron Corp., Claymont, Del.
Clayton Mfg. Co., 401 N. Temple City, El Monte, Calif.
Clayton & Lambert Mfg. Co., 1701 Dixie Hwy., Louisville 10, Ky.
Cleaver-Brooks Co., 326 E. Keefe Ave., Milwaukee 12, Wis.
Cleveland Brass Mfg. Co., The, 4606 Hamilton Ave., Cleveland, O.
Cleveland Crane & Eng. Co., 5866 E. 289th St., Wickliffe, O.
Cleveland Fuel Equipment Co., 1111 Brookpark Rd., Cleveland 9, O.
Cleveland Graphite Bronze Co., 17000 St. Clair Ave., Cleveland 10, O
Cleveland Humidifier Co., 7802 Wade Park Ave., Cleveland 3, O.
Cleveland Punch & Shear Works Co., E. 40th and St. Clair Ave., Cleveland 14, O.
Cleveland Worm & Gear Co., 3249 E. 80th St., Cleveland 4, O.
Clifford Mfg. Co., Div. of Standard-Thomson Corp., 152 Grove St., Waltham 54, Mass.
Climatemaker Heat Loss Calculator Co., Box 378, Bloomington, Ill.
Climax Machinery Co., 301 S. LaSalle St., Indianapolis, Ind.
Climax Metal Products Co., 863 E. 140 St., Cleveland 10, O.
Clinton Metallic Paint Co., P. O. Box 278, Clinton, N. Y.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Clow & Sons, James B., 201-299 N. Talman Ave., Chicago 12, Ill.
Cobra Pipe & Coil Co., Inc., Brook St., P. O. Box 176, Elmwood 10, Conn.
Cochrane Corp., 3131 N. 17th St., Philadelphia 32, Pa.
Coe Mfg. Co., Bank St., Painesville, O.
Coen Co., 40 Broadman Pl., San Francisco 3, Calif.
Coffin Co., J. S., Jr., 326 S. Dean St., Englewood, N. J.
Coffing Hoist Co., Danville, Ill.
Coolerator Co., New Garrick Bldg., Duluth, Minn.
Cole-Sewell Engineering Co., 2288 University Ave., St. Paul 4, Minn.
Coleman-Pettersen Corp., 2130 St. Clair Ave., Cleveland 14, O.
Colonial Alloys Co., Metals Div., Ridge Ave. and Crawford St., Philadelphia 29, Pa.
Columbia Boiler Co., Pottstown, Pa.

Columbia Engineering Service Co., 4025 Sebastopol Hiway, Santa Rosa, Calif.
Columbia-Geneva Steel Div., United States Steel Corp., Russ Bldg., 235 Montgomery St., San Francisco 6, Calif.
Columbian Steel Tank Co., 1509 W. 12th St., Kansas City 7, Mo.
Columbus Heating & Ventilating Co., 182 N. Yale Ave., Columbus 16, O.
Columbus Steam Pump Wks. Co., 724 W. Gay St., Columbus 8, O.
Combustion Control Corp., 718 Beacon St., Boston 15, Mass.
Combustion Engineering, Inc., 200 Madison Ave., New York 16, N. Y.
Combustion Equipment Co., Box 734 B, Silvis, Ill.
Comfort Products Corp., 2220 Lamesa, Dallas 2, Tex.
Commercial Filters Corp., 2 Main St., Melrose 76, Mass.
Commercial Plastics Co., 2812 W. North Ave., Chicago 47, Ill.
Commercial Shearing & Stamping Co., 1775 Logan, P. O. Box 719, Youngstown 1, O.
Commercialaire, Inc., 300 Pacific St., Brooklyn 2, N. Y.
Committee on Steel Pipe Research, American Iron and Steel Institute, 350 Fifth Ave., New York 1, N. Y.
Commonwealth Brass Corp., 5781-5835 Commonwealth Ave., Detroit 8, Mich.
Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill.
Condensation Engineering Corp., 3511 W. Potomac Ave., Chicago 31, Ill.
Condenser Service & Engineering Co., Inc., 95 River St., Hoboken, N. J.
Conditionaire Unit Co., 2821 Montrose Ave., Chicago 18, Ill.
Congress Drives Div., Tann Corp., 3750 E. Outer Drive, Detroit 34. Mich.
Congress Fan & Electric Co., P. O. Box 3747, Peninsula Sta., Daytona Beach, Fla.
Conneaut Plastic Metallic Packing Co., Conneaut, O.
Connery Construction Co., 2nd and Luzerne Sts., Philadelphia 40, Pa.
Connor Engineering Corp., Danbury, Conn.
Conoflow Corp., Dept. P, 2100 Arch St., Philadelphia 3, Pa.
Consolidated Boiler Corp., 126 Dartmouth St., Boston 16, Mass.
Consolidated Metal Products Corp., Albany, N. Y.
Continental Air Filters, Inc., Box 1647, Louisville 1, Ky.
Continental-Diamond Fibre Co., Newark, Del.
Continental Electric Co., Inc., 323 Ferry St., Newark, N. J.
Continental Machine Co., 1952-54 Maud Ave., Chicago 14, Ill.
Continental Motors Corp., Muskegon 82, Mich.
Continental Products Co., 1150 E. 222nd St., Euclid 17, O.
Continental Radiant Glass Heating Corp., 1 E. 35th St., New York 16, N. Y.
Continental Rubber Wks., 2000 Liberty St., Erie, Pa.
Continental Screw Co., Mt. Pleasant St., New Bedford, Mass.
Continental Steel Corp., 1108 S. Main St., Kokomo, Ind.
Contour Marker Corp., 1843½ E. Compton Blvd., Compton 2, Calif.
Controlair Mfg. Co., 1932 S. Compton Ave., Los Angeles, Calif.
Cook Co., Loren, 664 Front St., Berea, O.
Cook Electric Co., 2700 Southport Ave., Chicago 14, Ill.
Cooper Alloy Foundry Co., The, Bloy St. & Ramsey Ave., Hillside, N. J.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Cooper Co., Clark, Palmyra, N. J.
Cooper Hewitt Electric Co., 72-732 Grand St., Hoboken, N. J.
Copeland Refrigeration Corp., Sidney, O.
Copes-Vulcan Div., Continental Foundry & Machine Co., 939 West 26th St., Erie 4, Pa.
Copper Boiler & Heater Wks., 501 J. St., Manitowoc, Wis.
Coppus Engineering Corp., 344 Park Ave., Worcester 2, Mass.
Coral Designs, Div. of Henry G. Dietz Co., 12-16 Astoria Blvd., Long Island City 2, N. Y.
Corbman Bros., Inc., 25th & York St., Philadelphia, Pa.
Cordo Chemical Co., 34 Smith St., Norwalk, Conn.
Cork Insulation Co., Inc., 730-5th Ave., New York, N. Y.
Corley Co., Inc., The, One Exchange Place, Jersey City 2, N. J.
Corning Glass Works, Corning, N. Y.
Cornish-Rutland Co., Rutland, Vt.
Coroaire Heater Corp., The, 1124 Hanna Bldg., Cleveland 15, O.
Corrosite Div., Reliance Paint Co., 64 So. 6th St., Brooklyn, N. Y.
C-O Two Fire Equipment Co., Newark, N. J.
Coughlan Co., G. N., West Orange, N. J.
Couplings Co., 55 E. 18th St., Chicago 16, Ill.
Cox Mfg. Co., Ridgeville, Ind.
Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Crane Packing Co., 1872 Cuyler Ave., Chicago 13, Ill.
CraneVeyor Corp., 1240 S. Boyle Ave., Los Angeles 23, Calif.
Crawford Co., 3220 W. 31st St., Chicago 23, Ill.
Crescent Tool Co., 230 Harrison St., Jamestown, N. Y.
Croll-Reynolds Engineering Co., Inc., 17 John St., New York 38, N. Y.
Croll & Son, Jesse G., 2326-2606 Germantown Ave., Philadelphia, Pa.
Crosby Steam Gage & Valve Co., 43 Kendrick St., Wrentham, Mass.
Crosley Div., Avco Mfg. Corp., Cincinnati, O.
Crotty Mfg. Corp., 133-15 35th Ave., Flushing, L. I., N. Y.
Crowell & Dunn, Inc., 225 Lafayette St., New York, N. Y.
Crown Controls Co., Inc., 124 S. Washington St., New Bremen, O.
Crown Die & Tool Co., 108 N. Jefferson St., Chicago 6, Ill.
Crown Iron Works Co., 1202 N. E. Tyler, Minneapolis, Minn.
Crucible Steel Co. of America, Oliver Bldg., P. O. Box 88, Pittsburgh 30, Pa.
Cryer Trap & Valve Div., Encor Corp., 28 Joralemon St., Belleville, N. J.
Culligan Inc., Northbrook, Ill.
Cummins Portable Tool Co., 4740 N. Ravenswood, Chicago, Ill.
Cuno Engineering Corp., 80 S. Vine St., Meriden, Conn.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., 1950 Kienlen Ave. St. Louis 20, Mo.
Custom Engineering Co., 406 S. Main St., Los Angeles 13, Calif.
Cutler-Hammer, Inc., 421 N. 12th St., Milwaukee 1, Wis.
Cyclotherm Div., United States Radiator Corp., 157 E. First St., Oswego, N. Y.

D

Daffin Mfg. Co., Lancaster, Pa.
Dahlquist Mfg. Co., Inc., Div. of Process Engineering Inc., 628 Somerville Ave., Somerville 43, Mass.
Daigger & Co., A., 161 W. Kinzie St., Chicago, Ill.
Dalmo-Victor Co., San Carlos, Calif.
Daly, Merritt & Sullivan, Inc., West Broad St., Falls Church, Va.
Dalzen Mfg. Co., 525 South Riverside, St. Clair, Mich.
Dampney Co., The, 1243 River St., Hyde Park, Boston 36, Mass.
Dana Fan & Blower Corp., 3501-27 Colerain Ave., Cincinnati 23, Ohio.
Danzer Metal Works Co., Box 201, Hagerstown, Md.
Darcoid Co., Inc., 145 Sixth Ave., New York 13, N. Y.
Darling Valve & Mfg. Co., 701 First St., Williamsport, Pa.
Dart Union Co., 134 Thurbers Ave., Providence 5, R. I.
Das Div. of The Zeller Corp., Fort Wayne Rd., Defiance, O.
Davey Compressor Co., Kent, O.
Davidson Co., M. T., 7 Dey St., New York 7, N. Y.
Davidson Hyduty Roof Fan Co., 213 California St., Newton, Mass.
Davies & Co., Wayne, Westboro, Mass.
Davis Engineering Corp., 1070 E. Grand St., Elizabeth 4, N. J.
Davis Instruments, Div. of Davis Emergency Equipment Co., Inc., 201 Halleck St., Newark 4, N. J.
Davis Regulator Co., 2546 S. Washtenaw Ave., Chicago 8, Ill.
Davison Chemical Corp., The, 101 N. Charles St., Baltimore 3, Md.
Day & Night Div., Affiliated Gas Equipment, Inc., 700 Royal Oaks Dr., Monrovia, Calif.
Day Co., The, 810-830 Third Ave., N. E., Minneapolis 13, Minn.
Dayton Air Compressor Co., The, 427 Valley St., Dayton 4, O.
Dayton Electric Mfg. Co., 118 S. Oakley Blvd., Chicago 12, Ill.
Dayton Pump & Mfg. Co., 500 N. Webster St., Dayton 1, O.
Dayton Rubber Co., 2342 W. Riverview Ave., Dayton 1, O.
Dean Brothers Pumps, Inc., 323 W. 10th St., Indianapolis 7, Ind.
Dean Hill Pump Co., 4000 E. 16th St., Indianapolis 7, Ind.
Dearborn Chemical Co., Merchandise Mart Plaza, Chicago 54, Ill.
Dearborn Stove Co., 1700 W. Commerce St., P. O. Box 5527, Dallas 2, Tex.
Debevoise Co., The, 74-84 20th St., Brooklyn 32, N. Y.
DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Decatur Iron & Steel Co., P. O. Box 72, Decatur, Ala.
Decatur Pump Co., 2750 Nelson Park Rd., Decatur, Ill.
Deering Air Conditioning Co., 1069 Celestial St., Cincinnati 2, Ohio
Defender Instrument & Regulator Co., 815 Clark Ave., St. Louis 2, Mo.
De Laval Steam Turbine Co., Trenton 2, N. J.
Delavan Mfg. Co., 811 Fourth Ave., West Des Moines, Ia.
Delco Appliance Div., General Motors Corp., P. O. Box 230, Rochester 1, N. Y.
Delco Products Div., General Motors Corp., 329 E. First St., Dayton 1, O.
Delta Heating Corp., Cole St. & Reading R. R., Trenton 8, N. J.
Delta-Star Electric Co., Div. of H. K. Porter Co., Inc., 2437 Fulton St., Chicago 12, Ill.
Deming Co., 14 Aetna St., Salem, O.
Demuth & Sons, Charles, 245 Elm Place, Mineola, L. I., N. Y.
Dersch, Gesswein & Neuert, Inc., 4849 W. Grand Ave., Chicago 39, Ill.
Desmond-Stephan Mfg. Co., Urbana, O.
Desolvo Co., The, 719 Foreland St., Pittsburgh 12, Pa.
d'Este Div., Kaye & MacDonald, Inc., 11-15 Central Ave., West Orange, N. J.
De-Tec-Tronic Laboratories, Inc., 1711 W. Terra Cotta, Chicago, Ill.
Detroit Brass & Malleable Works, 100 S. Campbell, Detroit 9, Mich.
Detroit Controls Corp., 5900 Trumball Ave., Detroit 8, Mich.
Detroit Diesel Engine Div., General Motors Corp., 13400 W. Outer Dr., Detroit 28, Mich.
Detroit Hoist & Machine Co., 8200 Morrow St., Detroit 11, Mich.
Detroit Stamping Co., 350 Midland Ave., Detroit 3, Mich.
Detroit Stoker Co., Fifth Floor, General Motors Bldg., Detroit 2, Mich.
Devenco, Inc., Swingfire Div., 150 Broadway, New York 38, N. Y.
Devices, Inc., 214 E. 53 St., New York 22, N. Y.
DeVilbiss Co., The, 300 Phillips Ave., Toledo 1, O.
Devine Mfg. Co., Inc., J. P., 49th and A.V.R.R., Pittsburgh 1, Pa.
Devoe & Raynolds Co., Inc., 44th St. and 1st Ave., New York 17, N. Y.
Dewey-Shepard Boiler Co., 1311 N. Capitol Ave., Indianapolis, Ind.
De Zurik Shower Co., Sartell, Minn.
Dialight Corp., 60 Stewart Ave., Brooklyn 37, N. Y.
Diamond Chain Co., Inc., 438 Kentucky Ave., Indianapolis 7, Ind.
Diamond Chemical Products, 17 E. 48th St., New York 17, N. Y.
Diamond Expansion Bolt Co., Inc., 500 North Ave., Garwood, N. J.
Diamond Iron Works Co., 1728 Second St. N., Minneapolis 11, Minn.
Diamond Machine Tool Co., 5111 Coffman-Pico Rd., Pico, Calif.
Diamond Mfg. Co., 253 W. Eighth St., Wyoming, Pa.
Diamond Power Specialty Corp., P. O. Box 415, Lancaster, O.
Diceler Div. of General Machine & Mfg. Co., Blair St. and Spring Garden Ave., Berwick, Pa.
Dick Co., Inc., R. & J., 24-48 Sade St., Passaic, N. J.
Dickson Co., The, 7420 Woodlawn Ave., Chicago 19, Ill.
Diehl Mfg Co., Finderne Plant, 1106 Finderne Ave., Somerville, N. J.
Diesel Oil Burner Corp. of New York, 105-20 New York Blvd., Jamaica, Long Island, N. Y.
Dietzgen Co., Eugene, 2425 Sheffield Ave., Chicago 14, Ill.
Dillon Co., Inc., W. C., 14620 Keswick St., Van Nuys, Calif.

Dillon Steam Boiler Wks., Inc., D. M., Crocker St., Fitchburg, Mass.
Dings Magnetic Separator Co., 4740 W. Electric Ave., Milwaukee 46, Wis.
Division Lead Co., 7742 W. 61st Pl., Summit, Ill.
Dixon Crucible Co., Joseph, Wayne & Monmouth Sts., Jersey City 3, N. J.
DoAll Co., The, 254 N. Laurel Ave., Des Plaines, Ill.
Dockson Corp., 3839 Wabash Ave., Detroit 8, Mich.
Dockstader, Inc., S. E., 1128 Munsey Bldg., Washington 4, D. C.
Dodge Cork Co., Inc., Lancaster, Pa.
Dodge Mfg. Corp., 500 S. Union St., Mishawaka, Ind.
Doerr Electric Corp., Cedarburg, Wis.
Dole Refrigerating Co., 5910 N. Pulaski, Chicago 30, Ill.
Dole Valve Co., The, 1933 Carroll Ave., Chicago 12, Ill.
Dollinger Corp., 9 Centre Park, Rochester 3, N. Y.
Domestic Pump & Mfg. Corp., Shippensburg, Pa.
Don Mfg. Co., 6 N. Michigan Ave., Chicago 2, Ill.
Dormeyer Industries, 3418 Milwaukee Ave., Chicago 41, Ill.
Double Seal Ring Co., 2065 Montgomery, Fort Worth, Tex.
Dover Metal Products Co., The, Canal Fulton, O.
Dover Mfg. Co., Box 498, Independence, Mo.
Dow Chemical Co., The, Midland, Mich.
Dow Corning Corp., Midland, Mich.
Dowell Inc., P. O. Box 536, Tulsa 1, Okla.
Downingtown Iron Works, Wallace Ave., Downingtown, Pa.
Doyle & Roth Mfg. Co., Inc., Foot of 23rd St., Brooklyn 32, N. Y.
Doyle Vacuum Cleaner Co., 225 Stevens St., S. W., Grand Rapids 2, Mich.
Dravo Corp., Machinery Div., Dravo Bldg., Pittsburgh 22, Pa.
Drayer-Hanson, Inc., Box 2215, Terminal Annex, Los Angeles 54, Calif.
Dreier Brothers, 5642 Lake Park Ave., Chicago 37, Ill.
Dreis & Krump Mfg. Co., 7404 Loomis Blvd., Chicago 36, Ill.
Dreis Co., Ltd., Edward J., 841 County Rd., San Carlos, Calif.
Dresser Mfg. Div., Dresser Industries, Inc., 490 Fisher Ave., Bradford, Pa.
Drew & Co., Inc., E. F., 13 E. 26th St., New York, N. Y.
Drico Industrial Corp., 559 West 35 St., New York 1, N.Y.
Drinkwater, Inc., Spring & Madison St., Waukegan, Ill.
Driv-Way Lite Co., P. O. Box 2850, Denver, Colo.
Drying Systems, Inc., 1812½ W. Foster Ave., Chicago 40, Ill.
Dryomatic Corp., 812 N. Fairfax St., P. O. Box 334, Alexandria, Va.
Dual-Air Fan Co., P. O. Box 169, South Elgin, Ill.
Ducon Co., The, 147 E. 2nd St., Mineola, N. Y.
Dudgeon, Inc., Richard, 789 Bergen St., Brooklyn 38, N. Y.
Dunham Co., C. A., 400 W. Madison St., Chicago 6, Ill.
Dunkirk Radiator Corp., Dunkirk, N. Y.
Duo-Therm Div., Motor Wheel Corp., Lansing 3, Mich.
du Pont de Nemours & Co., E. I., Polychemicals Dept., Wilmington 98, Del.
du Pont de Nemours & Co., E. I., Electrochemicals Dept., Wilmington 98, Del.
du Pont de Nemours & Co., Inc., E. I., Kinetic Chemicals Div., 10th and Market Sts., Wilmington 98, Del.
du Pont de Nemours & Co., Inc., E. I., Fabrics & Finishes Dept., Wilmington 98, Del.
du Pont de Nemours & Co., E. I., Grasselli Chemicals Dept., Wilmington 98, Del.
du Pont de Nemours & Co., E. I., Photo Products Dept., Wilmington 98, Del.
Durabla Mfg. Co., 114 Liberty St., New York 6, N. Y.
Durakool, Inc., 1010 N. Main St., Elkhart, Ind.
Duraloy Co., Scottdale, Pa.
Durant Insulated Pipe Co., Palo Alto, Calif.
Durant International Corp., Williamstown, N. J.
Duriron Co., Inc., The, 450 N. Findlay St., Dayton 1, O.
Durkee-Atwood Co., 215 N. E. 7th St., Minneapolis, Minn.
Duro Co., 537 Monument Ave., Dayton, O.
Duro-Dyne Corp., 38 S. Franklin St., Hempstead, L. I., N. Y.
Duro Metal Products Co., 2649 N. Kildare Ave., Chicago, Ill.
Dust Filter Co., 134 S. LaSalle St., Chicago 3, Ill.
Dust Suppression & Engineering Co., 154 Grove St., Lake Orion, Mich.
Dustex Corp., 1758 Walden Ave., Buffalo 25, N. Y.
Dutton Boiler Div., Hapman-Dutton Co., 623 Gibson St., Kalamazoo 6, Mich.
Dwyer Mfg. Co., F. W., 323 S. Western Ave., Chicago 12, Ill.
Dynamic Air Engineering, Inc., 7412 Maie Ave., Los Angeles 1,
Dzus Fastener Co., Inc., P. O. Box 185, Babylon, N. Y.

E

Eagan Co., Inc., Walter H., 2336-38 Fairmount Ave., Philadelphia 30, Pa.
Eagle Chemical Co., Inc., P. O. Box 1221, Joliet, Ill.
Eagle-Picher Co., American Bldg., Cincinnati 1, O.
Eastern Air Devices, Inc., 585 Dean St., Brooklyn 17, N. Y.
Eastern Industries Inc., 396 Elm St., New Haven 6, Conn.
Eastern Stainless Steel Corp., P. O. Box 1975, Baltimore 3, Md.
Eastman Kodak Co., 343 State St., Rochester 4, N. Y.
Eaton Mfg. Co., 9771 French Rd., Detroit 13, Mich.
Ebco Mfg. Co., 401 W. Town St., Columbus 8, O.
Eckhart Mfg. Co., Inc., 831 Lehigh Ave., Union, N. J.
Eclipse Fuel Engineering Co., 1139 Buchanan St., Rockford, Ill.
Econocol Stoker Div. of Cotta Transmission Co., 2340 11th St., Rockford, Ill.
Economy Equipment Co., 4800 S. Hoyne, Chicago, Ill.
Economy Pumps Inc., Div. of Wheeler Mfg. Co., C. H., 19th & Lehigh, Philadelphia 32, Pa.
Economy Valve Seat Co., 1436 N. Keating, Chicago 51, Ill.
Eddington Metal Specialty Co., P. O. Box K, Eddington, Pa.
Eddy Stoker Corp., 4717 W. North Ave., Chicago 39, Ill.
Eddy Valve Co., Waterford, N. Y.
Edge Moor Iron Wks., Inc., Edge Moor 25, Del.
Edison, Inc., Thomas A., Instrument Div., 60 Lakeside Ave., West Orange, N. J.
Eds-Wil Burner Corp., 2656 Diversey Ave., Chicago 47, Ill.
Edward Valves, Inc., 1200 W. 145th St., East Chicago, Ind.
Edwards, L. V., 32 Irving Place, Rockville Center, N. Y.
Edwards Engineering Corp., Pompton Plains, N. J.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Eiker Mfg. Co., Ogallala, Neb.
Eisler Engineering Co., Inc., 754 S. 13th St., Newark 3, N. J.
Ejay Mfg. Co., 124 Boyd St., Winsted, Conn.
Elastic Porcelain Lining Corp., 221 Norris Dr., Rochester 10, N. Y.
Elastic Stop Nut Corp. of America, 2330 Vauxhall Rd., Union, N. J.
Elco Tool & Screw Corp., 1800 Broadway, Rockford, Ill.
Electradiant Corp., 500 Del Monte Ave., Monterey, Calif.
Electric Arc, Inc., 152 Jelliff Ave., Newark 8, N. J.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo 1, O.
Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland 4, O.
Electric Furnace-Man, Inc., Emmaus, Pa.
Electric Machinery Mfg. Co., 800 Central Ave., Minneapolis 13, Minn.
Electric Motor Corp., Div. of Howard Industries, Inc., Racine, Wis.
Electric Sprayit Co., The, 1415-25 Illinois Ave., Sheboygan, Wis.
Electric Steel Foundry Co., 2141 N. W. 25th St., Portland 10, Ore.
Electriglas Corp., Bergenfield, N. J.
Electrimatic Co., Sales Affiliate, Jas. P. Marsh Corp., 3501 Howard St., Skokie, Ill.
Electro Dynamic Div. of General Dynamics Corp., Bayonne, N. J.
Electrofilm, Inc., 7116 Laurel Canyon Blvd., North Hollywood, Calif.
Electro Products Laboratories, Inc., 4501 N. Ravenswood Ave., Chicago, Ill.
Electro Rust-Proofing Corp., Belleville, N. J.
Electrol Burner Mfg. Co., Inc., 22 Union Ave., Rutherford, N. J.
Electromode Corp., 45 Crouch St., Rochester 3, N. Y.
Electro-Switch & Controls Inc., 5755 Camille Ave., Culver City, Calif.
Electro-Therm, Inc., 931 Selim Rd., Silver Spring, Md.
Electrovent Fan & Mfg. Co., 812 W. Lake St., Chicago 7, Ill.
Elgen Mfg. Co., 41-34 39th St., Long Island City, N. Y.
Elgin-Refinite, Div. of Elgin Softener Corp., Elgin, Ill.
Elgin Softener Corp., Elgin, Ill.
Elgo Shutter & Mfg. Co., 2738 W. Warren Ave., Detroit 8, Mich.
Elliott Co., Jeannette, Pa.
Elliott Co., Crocker-Wheeler Div., Ampere, N. J.
Ellis Drier Co., 2444 N. Crawford Ave., Chicago 39, Ill.
Ellison Draft Gage Co., 548 W. Monroe St., Chicago, Ill.
Elraco Engineering Co., 732 W. 58th St., Los Angeles 37, Calif.
Emerson Electric Mfg. Co., The, 8100 Florissant Ave., St. Louis 21, Mo.
Emerson Radio and Phonograph Co., 111 Eighth Ave., New York 11, N. Y.
Empire Chemical Products Co., 10 Longworth St., Newark, N. J.
Empire Ventilation Equipment Co., 35-39 Vernon Blvd., Long Island City, N. Y.
Enderle, Inc., Ltd., Frank X., 1715 San Fernando Rd., Los Angeles 65, Calif.
Endura Mfg. Corp., 45 N. 4th St., Quakertown, Pa.
Engelhard, Inc., Charles, 850 Passaic Ave., East Newark, N. J.
Engineer Co., 75 West St., New York 6, N. Y.
Engineered Products Co., 6121 Morton St., Philadelphia 44, Pa.
Enterprise Engine & Machinery Co., Subsidiary of General Metals Corp., 18th & Florida Sts., San Francisco 10, Calif.
Equipoise Controls, 100 Stevens Ave., Mount Vernon, N. Y.
Erdle Perforating Co., 171 York St., Rochester 11, N. Y.
Ergolyte Mfg. Co., 3627 Lawrence St., N., Philadelphia 40, Pa.
Erickson Specialty Co., 10 Cayuga St., P. O. Box 141, Cohoes, N. Y.
Erie Bolt & Nut Co., Erie, Pa.
Erie City Iron Wks., 1450 East Ave., Erie, Pa.
Erie Tool Wks., 735 W. 12th St., Erie, Pa.
Ernst Water Column & Gauge Co., Livingston, N. J.
Ess Instrument Co., 96 S. Washington Ave., Bergenfield, N. J.
Essex Wire Corp., 1601 Wall Street, Ft. Wayne 6, Ind.
Essick Mfg. Co., 1950 Santa Fe Ave., Los Angeles 21, Calif.
Eston Chemicals, Div. American Potash & Chemical Corp., 3100 E. 26th St., Los Angeles, Calif.
Eutectic Welding Alloys Corp., 172 St. & Northern Blvd., Flushing 58, New York, N. Y.
Evans Corp., The, George, 37th St. at River Drive, Moline, Ill.
Evans Machine Co., Inc., 122 S. Calverton Rd., Baltimore, Md.
Even-Ray Co., Inc., 93 Tiffany Blvd., Newark 4, N. J.
Everhot Products Co., 2059 W. Carroll, Chicago 12, Ill.
Everite Pump & Mfg. Co., Inc., 617 No. Prince St., Lancaster, Pa.
Everlasting Valve Co., 49 Fisk St., Jersey City 5, N. J.
Evis Mfg. Co., 40 Boardman Pl., San Francisco 3, Calif.
Ewing Mfg. Co., 2545 N. W. 10th, Oklahoma City 7, Okla.
Excelsior Leather Washer Mfg. Co., 720-730 Chestnut St., Rockford, Ill.
Excelsior Steel Furnace Co., The, 118 S. Clinton St., Chicago 6, Ill.
Excelsior Tool & Machine Co., 31st & Ridge Ave., East St. Louis, Ill.
Extruded Plastics, Inc., New Canaan Ave., Norwalk, Conn.

F

Faber Engineering Co., Inc., Amber & Westmoreland Sts., Philadelphia 34, Pa.
Fabreeka Products Co., Inc., 222 Summer St., Boston, Mass.
Fabri-Valve Co. of America, 2100 N. Albina, Portland, Ore.

Fafnir Bearing Co., The, 37 Booth St., New Britain, Conn.
Fageol Heat Machine Co., 5725 Mt. Elliott Ave., Detroit 11, Mich.
Fairbanks Co., The, 393 Lafayette St., New York 3, N. Y.
Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.
Fairmont Aluminum Co., Fairmont, W. Va.
Fairmount Tool & Forging, 10611 Quincy Ave., Cleveland 6, O.
Falcon Equipment Co., 13th St., New Brighton, Pa.
Falk Corp., 3010 W. Canal St., Milwaukee 8, Wis.
Falstrom Co., 26 Falstrom Court, Passaic, N. J.
Famco Machine Co., 3114 Sheridan Rd., Kenosha, Wis.
Fano-Flame Oil Burner Corp., 3323 Olive St., Huntington Park, Calif.
Farley Sleeve & Hanger Co., 3748 E. 71st St., Cleveland, O.
Farquhar Co., A. B., Div. of The Oliver Corp., 142 N. Duke St., York, Pa.
Farr Co., P. O. Box 10187, Airport Station, Los Angeles 45, Calif.
Farrar & Trefts, 20 Milburn St., Buffalo 12, N. Y.
Farris Engineering Corp., 400 Commercial Ave., Palisades Park, N. J.
Farris Stacon Corp., 563 Commercial Ave., Palisades Park, N. J.
Fasco Industries, Inc., P. O. Box 509, Rochester 2, N. Y.
Faver, Inc., 770 S. 2nd St., W., Salt Lake City, Utah
Fedders-Quigan Corp., 57 Tonawanda St., Buffalo 7, N. Y.
Federal Machine & Welder Co., The, Overland Ave., Warren, O.
Federal-Mogul Corp., 11031 Shoemaker St., Detroit 13, Mich.
Federal Oil Burner Co., Inc., 3620 Walnut St., Philadelphia 4, Pa.
Federated Metals Div., American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Fee and Stemwedel, Inc., 2210 Wabansia Ave., Chicago 47, Ill.
Felt Products Mfg. Co., 1504 Carroll Ave., Chicago 7, Ill.
Felters Company, The, 210 South St., Boston 11, Mass.
Fenwal Inc., 130 Pleasant St., Ashland, Mass.
Ferguson & Lange Foundry Co., 1039 Willow St., Chicago, Ill.
Fern, Ralph, 2517 Boulevard Ave., Scranton 9, Pa.
Ferro-Nil Corp., 381 Fourth Ave., New York 16, N. Y.
Fibercast Corp., 100 S. Lincoln, Tulsa, Okla.
Field Control Div., H. D. Conkey & Co., Mendota, Ill.
Fielden Instrument Div., Robertshaw-Fulton Controls Co., 2920 N. 4th St., Philadelphia 33, Pa.
Filtair Mfg. Co., 487 S. Van Ness Ave., San Francisco 3, Calif.
Filtrine Mfg. Co., Inc., 53A Lexington Ave., Brooklyn 5, N. Y.
Finn & Co., Inc., T. R., 333 Jackson Ave., New York 54, N. Y.
Fire-King Stoker Co., 3760 E. St. Clair, Indianapolis, Ind.
Fireline Stove & Furnace Lining Co., 1800 Kingsbury St., Chicago 14, Ill.
Firestone Industrial Products, 1200 Firestone Pkwy., Akron 17, O.
Fir-Tex Insulating Board Co., St. Helens, Ore.
Fischer & Porter Co., 600 Warminster Rd., Hatboro, Pa.
Fish-Schurman Corp., 70 Portman Rd., New Rochelle, N. Y.
Fisher Governor Co., 205 S. First Ave., Marshalltown, Ia.
Fisher Research Laboratory, Inc., 1961 University Ave., Palo Alto, Calif.
Fitzgibbons Boiler Co., Inc., 101 Park Ave., New York 17, N. Y.
Flagg & Co., Inc., Stanley G., 1421 Chestnut St., Philadelphia 2, Pa
Flemm Lead Co., Inc., Bradley Ave. & School St., Long Island City 1, N. Y.
Flexaust Co., 100 Park Ave., New York 17, N. Y.
Flexible Metal Hose Mfg. Co., 640 W. 17th St., Costa Mesa, Calif.
Flexible Tubing Corp., Guilford, Conn.
Flexitallic Gasket Co., 918 N. 8th St., Camden 2, N. J.
Flexlock Corp., 218 Gougler Ave., Kent, O.
Flexo Supply Co., Inc., 4649 Page Blvd., St. Louis 13, Mo.
Flexonics Corp., 1391 S. Third Ave., Maywood, Ill.
Flexrock Co., 36 & Filbert Sts., Philadelphia 4, Pa.
Flintkote Co., The, 30 Rockefeller Plaza, New York 20, N. Y.
Flodar Corp., 1342 E. 45th St., Cleveland 3, O.
Flori Pipe Co., The, 5700 Bulwer, St. Louis 15, Mo.
Floridin Co., Warren, Pa.
Fluid Heat Div., Anchor Post Products, Inc., 6500 Eastern Ave., Baltimore 24, Md.
Fluid Systems, Inc., 1881 Dixwell Ave., New Haven 14, Conn.
Fluor Corp., Ltd., The, 2500 S. Atlantic Blvd., Los Angeles 22, Calif.
Flynn & Emrich Co., 301 Holliday St., Baltimore 2, Md.
Follansbee Steel Corp., 3rd and Liberty Aves., Pittsburgh, Pa.
Forney Engineering Co., 2705 Hawes St., Dallas 9, Tex.
Ft. Worth Steel & Machinery Co., P. O. Box 1038, Ft. Worth, Tex.
Forty-Eight Insulations, Inc., P. O. Box 472, Aurora, Ill.
Fossum, M. H., 2086 Marshall Ave., St. Paul, Minn.
Foster Co., Benjamin, 4635 W. Girard Ave., Philadelphia 31, Pa.
Foster Engineering Co., 835 Lehigh St., Union, N. J.
Foster Pump Wks., Inc., 46-A Washington St., Brooklyn 1, N. Y.
Foster Wheeler Corp., 165 Broadway, New York 6, N. Y.
Fostoria Pressed Steel Corp., Magnetic Pump Div., Fostoria, O.
Foxboro Co., 106 Neponset Ave., Foxboro, Mass.
Fram Corp., Providence 16, R. I.
France Packing Co., 9925 Bustleton Ave., Philadelphia 15, Pa.
Franklin Electric Co., Inc., 400 E. Spring St., Bluffton, Ind.
Frasse & Co., Peter A., 17 Grand, New York, N. Y.
Frederick Iron & Steel Inc., E. 7th St., Frederick, Md.
Freed Products Co., 1510 Third Ave., Moline, Ill.
Freeman Stoker Div., Illinois Iron & Bolt Co., 914 S. Michigan Ave., Chicago 5, Ill.
Fresh'nd-Aire Co., Div. of Cory Corp., 221 N. LaSalle St., Chicago 1.
Fretz-Moon Tube Co., Inc., P. O. Box 551, Butler, Pa.
Frick Co., Waynesboro, Pa.
Fricke, Fred J., 4404 Avenida Estrellita, Albuquerque, N.M.
Friedrich Refrigerators, Inc., 1117 E. Commerce, San Antonio, Tex.
Friermood Machine Works, Converse, Ind.
Friez Instrument Div., Bendix Aviation Corp., Taylor Ave., Towson, Baltimore 4, Md.
Frigid, Inc., 128 32nd St., Brooklyn, N. Y.
Frigidaire Div., General Motors Corp., Dayton 1, O.
Frontier Bronze Corp., Packard Rd., Niagara Falls, N. Y.
Frost Mfg. Co., S. Henderson St., Galesburg, Ill.
Fuel Reduction Corp., 220 N. Ada St., Chicago 7, Ill.
Fuel Savers, Inc., 15th and Herr Sts., Harrisburg, Pa.
Fuelguard Co., 5643 Dyer St., Dallas 6, Tex.
Fulflo Specialties Co., Inc., The, Blanchester, O.
Fuller Co., 124 Bridge St., Catasauqua, Pa.
Fuller Co., D. William, 2320 E. 75th St., Chicago 49, Ill.
Fuller Co. of Calif., H. B., 1060 Howard, San Fancisco, Calif.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Box 400, Knoxville 1, Tenn.
Furnas Electric Co., 1041 McKee St., Batavia, Ill.

G

G. D. S. Machinery & Supply Co., Inc., 101 Walker St., New York.
G & H Mfg. Co., 3047 Amber St., Philadelphia 34, Pa.
G. M. Mfg. Co., 50 W. 3rd St., New York 12, N. Y.
G & O Mfg. Co., 138 Winchester Ave., New Haven 8, Conn.
Gaines-Collins, Quijada Tool Division, 5474-78 Alhambra Ave., Los Angeles 32, Calif.
Gallaher Co., The, 4108 Dodge St., Omaha 3, Neb.
Galv-Weld Products, 602 Cook Tower, Lima, O.
Gannon Co., Inc., Russell R., The, 5037 Beech St., Cincinnati 12, O.
Garden City Fan Co., 332 S. Michigan Ave., Chicago 4, Ill.
Garden City Instruments, Inc., 608 S. Dearborn St., Chicago 5, Ill.
Gardiner Metal Co., 2514 W. 48th Pl., Chicago 32, Ill.
Gardner-Denver Co., Quincy, Ill.
Garlock Packing Co., 50 Main St., Palmyra, N. Y.
Gas & Oil Industry Laboratories, Inc., 4 Paine Ave., Irvington, N. J.
Gasflux Co., Mansfield, O.
Gasoilair Equipment Co., P. O. Box 768, New Haven, Conn.
Gates & Co., Inc., George W., Hempstead Turnpike & Lucille Ave., Franklin Sq., L. I., N. Y.
Gates Engineering Co., P. O. Box 1711, Wilmington, Del.
Gates Rubber Co., The, 999 S. Broadway, Denver 17, Colo.
Gateway Engineering Co., 3233 W. Grand Ave., Chicago, Ill.
Gatke Corp., 228 N. LaSalle St., Chicago 1, Ill.
Gehri Co.. 1117 Tacoma Ave.. Tacoma 3, Wash.
Gelber Co., Samuel S., 162 N. Clinton, Chicago, Ill.
General Blower Co., 8610 Ferris Ave., Morton Grove, Ill.
General Blower Co., Inc., 6137 Market St., Philadelphia 39, Pa.
General Ceramics & Steatite Corp., Keasbey, N. J.
General Chemicals Div., Allied Chemical & Dye Corp., 40 Rector St., New York, N. Y.
General Controls Co., 801 Allen Ave., Glendale 1, Calif. and Skokie, Ill.
General Corporation, 3353 University Ave., Minneapolis 14. Minn.
General Electric Co., Air Conditioning Div., 5 Lawrence St., Bloomfield, N. J.
General Electric Co., Apparatus Sales Div., 1 River Rd., Schenectady 5, N. Y.
General Electric Co., Chemical Div., 1 Plastics Ave., Pittsfield, Mass.
General Electric Co., Construction Materials Div., Bridgeport, Conn.
General Electric Co., Lamp Div., Nela Park, Cleveland 12, O.
General Electric Co., Major Appliance Div., 301 W. Liberty St., Louisville 2, Ky.
General Filter Co., 923 Second Ave., Ames, Ia.
General Filters, Inc., 43800 Grand River, Novi, Mich.
General Fittings Co., 123 Georgia Ave., Providence 5, R. I.
General Gas Light Co., 212 N. Park. Kalamazoo 11F, Mich.
General Heaters & Regulators Co., 4801 Railroad Ave., East Chicago, Ind.
General Heating Products Co., 7426 State Rd., Philadelphia, Pa.
General Insulating Products Co., 8821 15th Ave., Brooklyn, N. Y.
General Machinery Co., 3500 Riverside Ave., Spokane 1, Wash.
General Ozone Corp., 855 W. Washington Blvd., Chicago 7, Ill.
General Plate Div., Metals & Controls Corp., 34 Forest St., Attleboro, Mass.
General Power Plant Corp., 10 St. Paul's Pl., Ossining, N. Y.
General Scientific Equipment Co., 27th & Huntingdon Sts., Philadelphia 32, Pa.
Generator Sales Co., 1627 N. Damen Ave., Chicago 47, Ill.
Gerett Corp., M. A., 724 W. Winnebago St., Milwaukee 5, Wis.
Germatrol Corp., 622 Brookline Blvd., Pittsburgh 26, Pa.
Gerrard & Co., A. J., 1950 Hawthorne Ave., Melrose Park, Ill.
Gerstein & Cooper Inc., 1 W. 3rd St., South Boston, Mass.
Giannini & Co., Inc., G. M., 254 W. Colorado St., Pasadena 1, Calif.
Giant Mfg. Co., South Ave., Council Bluffs, Ia.
Gibson Refrigerator Co., Greenville, Mich.
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Gilbert Brass Foundry Co., 5028 Farlin St., St. Louis, Mo.
Gil-Lair Products, Inc., 81 Masonic Ct., Pasadena 3, Calif.
Gisholt Machine Co., 1253 E. Washington Ave., Madison 10, Wis
Glaser Lead Co., Inc., 31 Wyckoff Ave., Brooklyn, N. Y.
Glasfloss, 155 E. 44th St., New York 17, N. Y.
Glass Fibers, Inc., 1810 Madison Ave., Toledo, O.
Gleason-Avery, Inc., 45 Aurelius Ave., Auburn, N. Y.
Glenwood-Inglewood Co., Glenwood Ave. at Thomas, Minneapolis 5.
Globe Phone Mfg. Co., 2 Linden St., Reading, Mass.
Globe Steel Tubes Co., 3839 W. Burnham St., Milwaukee 46, Wis.
Goder Incinerator Corp., 407 S. Dearborn St., Chicago 5, Ill.
Goethel Sheet Metal Wks., Alfred, 3218 W. Fond du Lac Ave., Milwaukee 10, Wis.
Golden-Anderson Valve Specialty Co., Keenan Bldg., Pittsburgh, Pa.
Goldens' Foundry & Machine Co., Columbus, Ga.

Gold Star Oil Burner Mfg. Co., Inc., 146 Warburton Ave., Yonkers, N. Y.
Goodfellow Co., Inc., E. D., 496 E. Bodley Ave., Memphis, Tenn.
Goodrich Co., B. F., 548 S. Main St., Akron 18, O.
Goodyear Tire & Rubber Co., 1144 E. Market St., Akron 16, O.
Gordon & Piatt, P. O. Box 331, Winfield, Kan.
Gorman-Rupp Co., 305 Bowman, Mansfield, O.
Gorton Heating Corp., Cranford, N. J
Goss Gas Inc., 5209 Baum Blvd., Pittsburgh 24, Pa.
Gotham Instrument Co., Div., American Machine & Metals, Inc., 149 Wooster St., New York 12, N. Y.
Goulds Pumps, Inc., Fall St., Seneca Falls, N. Y.
Governair Corp., 513 N. Blackwelder St., Oklahoma City 1, Okla.
Grabler Mfg. Co., 6565 Broadway, Cleveland 5, O.
Graham Mfg. Co., Inc., 415 Lexington Ave., New York 17, N. Y.
Graham Transmissions, Inc., Menomonee Falls, Wis.
Granite City Steel Co., 20th & Madison Ave., Granite City, Ill.
Grant Wilson Inc., 141 W. Jackson Blvd., Suite 1560, Chicago, Ill.
Graphic Calculator Co., 633 Plymouth Ct., Chicago 5, Ill.
Graphic Indicator Co., 1739 S. La Cienega Blvd., Los Angeles 35, Calif.
Graton & Knight Co., 356 Franklin St., Worcester 4, Mass.
Graver Water Conditioning Co., 216 W. 14th St., New York 11, N. Y.
Gray Co., Inc., Graco Square, Minneapolis 13, Minn.
Gray Metal Products, Inc., 30 Carleton St., Rochester, N. Y.
Great National Air Conditioning Corp., 342 Oklahoma Natural Bldg., Oklahoma City, Okla.
Green Fire Brick Co., A. P., Mexico, Mo.
Green Fuel Economizer Co., 780 Main St., Beacon, N. Y.
Greene, Tweed & Co., North Wales, Pa.
Greenfield Tap & Die Corp., Sanderson St., Greenfield, Mass.
Greenheck Bros. Mfg. Co., Schofield, Wis.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., 2136 12th St., Rockford, Ill.
Greer Hydraulics, Inc., 454 18th St., Brooklyn 15, N. Y.
Greiner Co., Emil, 20-26 N. Moore St., New York 13, N. Y.
Grief, Edward C., 64 West End Ave., Bogota, N. J.
Griffin & Co., 500 Bergman Ave., Louisville 8, Ky.
Griffith Equipment Co., Inc., 4503 Alzer, Los Angeles, Calif.
Grinnell Co., Inc., 260 W. Exchange St., Providence 1, R. I.
Grip Nut Co. 310 S. Michigan Ave., Chicago, Ill.
Griscom-Russell Co., The, Massillon, O.
Gro-Quick Co., 340 W. Huron St., Chicago 10, Ill.
Gross-Aire Mfg. Co., 9416 W. Milton Ave., Overland 14, Mo.
Grove Regulator Co., 6529 Hollis St., Oakland, Calif.
Guardian Electric Mfg. Co., 1621 W. Walnut St., Chicago 12, Ill.
Guardian Products Corp., 1215 E. 2nd St., Michigan City, Ind.
Guild & Garrison, Inc., 43 Keap St., Brooklyn 11, N. Y.
Gulf Oil Corp., P. O. Box 1166, Gulf Bldg., Pittsburgh 30, Pa.
Gunnite Foundries Corp., 302 Peoples Ave., Rockford, Ill.
Gustin-Bacon Mfg. Co., 210 W. 10th St., Kansas City 6, Mo.
Guth Co., Edwin F., 2615 Washington Blvd., St. Louis 3, Mo.

H

H. A. Mfg. Co., 1612 W. King St., York, Pa.
H-B Instrument Co., American & Bristol Sts., Philadelphia 40, Pa.
H & H Tube & Mfg. Co., 245-275 N. Forman Ave., Detroit 17, Mich.
H-P Products, Inc., Louisville, O.
Haering & Co., Inc., D. W., P. O. Box 6037, Harlandale Sta., San Antonio, Tex.
Haertel Co., Walter, 2840 4th Ave., S., Minneapolis, Minn.
Hagan Corp., Hagan Bldg., Pittsburgh 30, Pa.
Hager Bros., East P. O. Box 1511, Rockford, Ill.
Hague & Co., Alfred, 230 Thirty-fourth St., Brooklyn 32, N. Y.
Haines & Co., Inc., William S., Div. Sellers Injector Corp., 1010-12 1600 Hamilton St., Philadelphia 30, Pa.
Halstead & Mitchell, Bessemer Bldg., Pittsburgh 22, Pa.
Hamburg Boiler Wks., Inc., Grand St., Hamburg, Pa.
Hamer Oil Tool Co., 2919 Gardenia Ave., Long Beach 6, Calif.
Hamilton Rubber Mfg. Corp., Box 361, Trenton 3, N. J.
Hammel-Dahl Co., 175 Post Rd. (Warwick), Providence 5, R. I.
Hammett Electric Mfg. Co., 209 W. 19th Terrace, Kansas City 8, Mo.
Hammond Brass Wks., Summer Blvd., Hammond, Ind.
Hampton-Cross Co., The, 120 S. 10th St., Louisville 2, Ky.
Hampton Electric Mfg. Co., 1238 Voskamp St., Pittsburgh 12, Pa.
Handy & Harman, 82 Fulton St., New York 38, N. Y.
Haney Gas Burner & Engineers, 909 S. Myrtle Ave., Monrovia, Calif.
Hanna Engineering Wks., 1765 N. Elston, Chicago 22, Ill.
Hanovia Chemical & Mfg. Co., 100 Chestnut St., Newark 5, N. J.
Hansen Mfg. Co., Inc., Princeton 6, Ind.
Hanson-Gates Mfg. Co., Inc., 8 Prescott St., Reading, Mass.
Harco Corp., 16901 Broadway, Cleveland, O.
Hardinge Oil Burner & Mfg. Co., 1700 Berteau St., Chicago 13, Ill.
Hardy, Inc., Charles, 420 Lexington Ave., New York, N. Y.
Harnischfeger Corp., 4400 W. National Ave., Milwaukee 46, Wis.
Harper Co., H. M., Morton Grove, Ill.
Harrington & King Perforating Co., 5655 Fillmore St., Chicago 44, Ill.
Harris, A. R., 4548 Hohman Ave., Hammond, Ind.
Harris & Co., Arthur, 210 N. Aberdeen St., Chicago 7, Ill.
Harris Calorific Co., The, 5501 Cass Ave., N. W., Cleveland 2, O.
Harrisburg Steel Corp., 10th & Herr Sts., Harrisburg, Pa.
Harry Cooling Towers, Inc., 125 Cedar St., New York 6, N. Y.
Hart & Cooley Mfg. Co., Holland, Mich.
Hart Mfg. Co., The, 116 Bartholomew Ave., Hartford 1, Conn.
Hartmann Co., Chas., 985 Dean St., Brooklyn, N. Y.
Hartwell & Son, Inc., H. N., Park Square Bldg., Boston, Mass.
Hartzell Propeller Fan Co., P. O. Box 909, Roosevelt Ave., Piqua, O
Harvey-Whipple, Inc., Springfield, Mass.
Hasco Valve & Machine Co., 1263 N. 70th St., Milwaukee 13, Wis.
Haskell Mfg. Co., Wm. H., 24 Commerce St., Pawtucket, R. I.
Hastings Air Conditioning Co., Box 481, 108 S. Colorado Ave., Hastings, Neb.
Hastings Instrument Co., Inc., Superhighway at Pine Ave., Hampton 33, Va.
Hauck Mfg. Co., 127-137 10th St., Brooklyn 15, N. Y.
Hausman Mfg. & Sales Co., Dept. HP, 3729 W. Grand Ave., Chicago 51, Ill.
Haveg Corp., Newark, Del.
Havens Structural Steel Co., 1713 Crystal Ave., Kansas City, Mo.
Haydon Mfg. Co., Inc., Sub. General Time Instruments Corp., Torrington, Conn.
Hayes Furnace Mfg. & Supply Co., 2929 S. Fairfax Ave., Los Angeles 16, Calif.
Hays Corp., 800 E. 8th St., Michigan City, Ind.
Hays Mfg. Co., 801 W. 12th St., Erie, Pa.
Health Trola Div., Excel Heating & Air Conditioning Co., 3715 Belmont Ave., Chicago 18, Ill.
Healey Co., Lee, 554 W. Garfield, Glendale 4, Calif.
Healy Ruff Co., 2257 University Ave., St. Paul 4, Minn.
Heartley Machine & Tool Co., 900-8 Summit St., Toledo, O.
Heat Equipment, Not Inc., 1020 E. 75th St., Chicago 19, Ill.
Heat Timer Corp., 657 Broadway, New York 12, N. Y.
Heatron, Inc., 333 Eberts Lane, York, Pa.
Heat X-Changer Co., Inc., The, Brewster, N. Y.
Heating Assurance, Inc., 124 E. Augusta St., Spokane 13, Wash.
Hegeler Zinc Co., P. O. Box 599, Danville, Ill.
Heil Process Equipment Corp., 12901 Elmwood Ave., Cleveland, O.
Heinemann Electric Co., Trenton, N. J.
Helical Tube Corp., 19 Washington Street, East Orange, N. J.
Helicoid Gage Div., American Chain & Cable Co., Inc., Bridgeport 2, Conn.
Hendley & Whittemore, 6 Blackhawk Blvd., Beloit, Wis.
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.
Henkel-Clauss Co., The, Fremont, O.
Henriksen Co., C. O., 2300 S. Avers Ave., Chicago 23, Ill.
Henry Furnace Co., The, Medina, O.
Henry Valve Co., 3215 North Ave., Melrose Park, Ill.
Henry & Wright, Div. of Emhart Mfg. Co., 760 Windsor St., Hartford, Conn.
Her-Born Engineering & Mfg. Co., 212 Columbus Ave., Sandusky, O.
Herbusch Corp., The, 706 Chestnut St., 210 Title Guaranty Bldg., St. Louis 1, Mo.
Hercules Chemical Co., Inc., 332 Canal St., New York 13, N. Y.
Hercules Electric & Mfg. Co., Inc., 2500 Atlantic Ave., Brooklyn 7, N. Y.
Heresite & Chemical Co., Manitowoc, Wis.
Hermon Hosmer Scott, Inc., 385 Putnam Ave., Cambridge 39, Mass.
Hersey Mfg. Co., Cor. E and 2nd Sts., South Boston 27, Mass.
Hershey Machine & Foundry Co., Motorstokor Div., Manheim, Pa.
Hertner Electric Co., The, 12690 Elmwood Ave., Cleveland 11, O.
Hetzel Roofing Products Co., 67 Maine St., Newark 5, N. J.
Hexdall Co., A. M., Morris, Ill.
Hi-Flow Products, Inc., 64 E. Hoffman Ave., Lindenhurst, N. Y.
Highside Chemicals Co., 10 Colfax Ave., Clifton, N. J.
Hill Diesel Engine Corp., Lansing 3, Mich.
Hill, E. Vernon & Co., P. O. Box 189, Lake Geneva, Wis.
Hill, Hubbell & Co., 3091 Mayfield Rd., Cleveland 18, O.
Hills-McCanna Co., 3023 N. Western Ave., Chicago 18, Ill.
Hilo Varnish Corp., Div. of Carpenter-Morton Co., 376 Third St., Everett 49, Mass.
Himelblau Associates, Inc., 5401 W. Harrison St., Chicago 7, Ill.
Hinde & Dauch Paper Co., P. O. Box 861, Sandusky, O.
Hindle Transformer Co., Inc., Woods Church Rd., Flemington, N. J.
Hinrichsen, Inc., A. F., 50 Church St., New York, N. Y.
Hirschman-Pohle Co., Inc., 12 Lent Ave., LeRoy, N. Y.
Hobart Bros., Co., Troy 1, O.
Hobsite Products Co., 308 Sussex St., Harrison, N. J.
Hodge Boiler Wks., 99-111 Sumner St., East Boston 28, Mass.
Hodgman Mfg. Co., 135 Washington St., Taunton, Mass.
Hoffberger Co., C., Monument and Forrest, Baltimore 2, Md.
Hoffman Combustion Engrg. Co., 710 Marquette Bldg., Detroit, Mich.
Hoffman Specialty Mfg. Corp., 1001 York St., Indianapolis 7, Ind.
Hogan & Co., Inc., C. T., 383 Madison Ave., New York 17, N. Y.
Holby Valve Co., 1146 Second Ave., New York 21, N. Y.
Holcomb & Hoke Mfg. Co., Inc., 1545 Van Buren, Indianapolis 7, Ind.
Holden Fan Co., 2503 Danforth, Detroit, Mich.
Hold-Tite Valve Mfg. Co., 550 5th Ave., New York 36, N. Y.
Hollands Mfg. Co., Erie, Pa.
Holoal Mfg. Co., Box 95, Bellerose 26, N. Y.
Holsclaw Bros., Inc., 408 N. Willow Rd., Evansville 11, Ind.
Homestead Valve Mfg. Co., P. O. Box 348, Coraopolis, Pa.
Hood Refining Co., 182 N. Hamilton Ave., Greensburg, Pa.
Hook & Ackerman, Inc., 9 E. 40th St., New York 16, N. Y.
Hooper Engineering Co., Liberty Center, O.
Hoover Co., The, Electric Motor Div., 68 Brook Ave., North Plainfield, N. J.
Hoppes Mfg. Co., Inc., 850 N. Belmont Ave., Springfield, O.
Horn Co., Inc., A. C., 10th St. & 44th Ave., Long Island City, N. Y.
Horton Mfg. Co., 1179 15th Ave., Minneapolis 14, Minn.
Hossfeld Mfg. Co., 460 W. Third St., Winona, Minn.
Hotpoint Co., 5600 W. Taylor St., Chicago 44, Ill.
Hotstream Heater Co., 2363 E. 69th St., Cleveland 4, O.
Houghton & Co., E. F., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Howard Iron Wks. & Alberger Heater Div., 287 Chicago St., Buffalo 4, N. Y.
Howe Ice Machine Co., 2825 Montrose Ave., Chicago 18, Ill.
Howell Electric Motors Co., Howell, Mich.

Howes-Woods Co., 201 Bridge St., Cambridge, Mass.
Hubbell Corp., P. O. Box 700, Hawley Rd., Mundelein, Ill.
Hudson Industries, Inc., 4400 St. Aubin Ave., Detroit 7, Mich.
Humboldt Mfg. Co., 2016 N. Whipple St., Chicago, Ill.
Hungerford & Terry, Inc., Clayton, N. J.
Hunt & Son, C. B., Inc., Salem, O.
Hunter Fan and Ventilating Co., Inc., 400 S. Front St., Memphis, Tenn.
Hunter Mfg. Co., Mirror Insulation Div., Bristol, Pa.
Hupp Corp., Globe Stamping Div., 1250 W. 76th St., Cleveland 2, O.
Huron Boiler Co., 10457 Gratiot Ave., Detroit 13, Mich.
Hussey & Co., C. G., Div. of Copper Range Co., 2850 Second Ave., Pittsburgh 19, Pa.
Huyette Co., Inc., Paul B., 401 N. Broad St., Philadelphia 8, Pa.
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
Hydraulic Mfg. Co., Kiel, Wis.
Hydrocol-Air-Sanitation, Inc., 136 Liberty St., New York, N. Y.
Hynes Electric Heating Div., Turbine Equipment Co., P. O. Box 578, Westfield, N. J.
Hypro Engineering Co., 440 N. Washington Ave., Minneapolis, Minn.

I

Ideal Electric & Mfg. Co., E. First & Oak Sts., Mansfield, O.
Ideal Industries, Inc., 1096 Parke Ave., Sycamore, Ill.
Iden Associates, 1809 N. Milwaukee Ave., Chicago 47, Ill.
Ilg Electric Ventilating Co., 2841 N. Crawford Ave., Chicago 41, Ill.
Illinois Bronze Powder Co., 2015 S. Clark St., Chicago 16, Ill.
Illinois Engineering Co., Div. of American Air Filter Co., Inc., 2035 S. Racine Ave., Chicago 8, Ill.
Illinois Malleable Iron Co., 1801 Diversey Parkway, Chicago 14, Ill.
Illinois Oil Products, Inc., 4th Ave. and 24th St., Rock Island, Ill.
Illinois Testing Laboratories, Inc., 420 N. La Salle St., Chicago 10 Ill.
Illinois Water Treatment Co., 840 Cedar St., Rockford, Ill.
Illinois Zinc Co., 2959 W. 47th St., Chicago 32, Ill.
Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago 7, Ill.
Imperial Electric Co., 64 Ira Ave., Akron, O.
Imsco Mfg. Co., 4215-A Gaston Ave., Dallas, Tex.
Independent Register Co., 3747 E. 93rd St., Cleveland 5, O.
Indiana Fan Company, 427 S. Alabama St., Indianapolis 4, Ind.
Industrial Acoustics Co., Inc., 341 Jackson Ave., New York 54, N. Y.
Industrial Engineered Products Co., 7416 Melrose Ave., Los Angeles 46, Calif.
Industrial Engineering Corp., Terre Haute, Ind.
Industrial Engineering & Equipment Co., 711 S. Theresa Ave., St. Louis 3, Mo.
Industrial Mfg. & Engineering Co., 3033 W. Belmont Ave., Chicago 18, Ill.
Industrial Metal Protectives, Inc., 401 Homestead Ave., Dayton 8, O
Industrial Screw Co., 711 W. Lake St., Chicago 6, Ill.
Industrial Service Laboratories, 7656 W. Forest Home Ave., Milwaukee 14, Wis.
Industrial Sound Control, Inc., 45 Granby St., Hartford 12, Conn.
Infra Insulation, Inc., 525 Broadway, New York, N. Y.
Ingersoll Products Div., Borg-Warner Corp., 310 S. Michigan Ave. Chicago 4, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Ingersoll Steel Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Inland Steel Products Co., P. O. Box 393, Milwaukee 1, Wis
Inner-Tite Div. of Yara Engineering Corp., 18 W. Jersey St., Elizabeth 4, N. J.
Instant Drying Corp., 101 Park Ave., New York, N. Y.
Insto-Gas Corp., 1977 E. Woodbridge St., Detroit 7, Mich.
Instruments, Inc., Wright Bldg., Tulsa, Okla.
Insulite Div. Minnesota and Ontario Paper Co., 500 Baker Arcade Bldg., Minneapolis 2, Minn.
Insul-Mastic Corp., Oliver Bldg., Pittsburgh, Pa.
Inter-Coastal Paint Corp., 13th St. and Southern R. R., East St. Louis Ill.
Interchemical Corp., Finishes Div., 224 McWhorter St., Newark 1.
International Boiler Works Co., The, East Stroudsburg, Pa.
International Business Machines Corp., 590 Madison Ave., New York 22, N. Y.
International Engineering, Inc., 1145 Bolander Ave., Dayton 1, O.
International Forge Co., Chicago, Ill.
International Heater Co., 101 Park Ave., Utica 2, N. Y.
International Mfg. Co., 600 E. Grand Ave., Oklahoma City, Okla.
International Metal Products Co., Phoenix, Ariz.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
International Powder Metallurgy Inc., Ridgway, Pa.
International Register Co., 2624 W. Washington Blvd., Chicago 12, Ill
International Sales Co., 2045 Evans Ave. San Francisco 24, Calif.
International Steel Co., 1545 Edgar St., Evansville, Ind.
International Vermiculite Co., Girard, Ill.
Interstate Sales Co., 123 E. 18th St., New York 3, N. Y.
Iona Ventilator Co., Inc., 2821-29 W. Dauphin St., Philadelphia 32
Iron City Chemical Co., Glycolator Division, Valencia, Pa.
Iron Fireman Mfg. Co., 3170 W. 106 St., Cleveland 11, O.
Iron Lung Ventilator Co., 5403 Prospect Ave., Cleveland 3, O.
Irvington Varnish and Insulator, Div. of Minnesota Mining & Mfg. Co., 6 Argyle Terrace, Irvington 11, N. J.
Isoflex Corp., 989 Folsom St., San Francisco 7, Calif.
Iwan Brothers, Inc., 1503 Prairie Ave., South Bend 14, Ind.

J

J O Mfg. Co., 8442 Otis St., South Gate, Calif.
Jabsco Pump Co., 2031 Lincoln St., Burbank, Calif.
Jack & Heintz, Inc., 17600 Broadway, Cleveland 1, O.
Jackes-Evans Mfg. Co., Controls Div., 4427 Geraldine Ave., St. Louis 15, Mo.
Jackson & Church Co., 321 N. Hamilton Ave., Saginaw 65, Mich.
Jaco Devices Co., 100 High St., Hingham, Mass.
Jacobs Co., Inc., B. & J., 1729 John St., Cincinnati 14, O.
Jacuzzi Bros., Inc., 5327 Jacuzzi Ave., Richmond, Calif.
Jaden Mfg. Co., 1601 Second St., Hastings, Neb.
James-Pond-Clark, 2181 E. Foothill Blvd., Pasadena 8, Calif.
Jamieson Mfg. Co., 819 Bedford, Dallas, Tex.
Jan-Air, Inc., Richmond, Ill.
Janette Elect. Mfg. Co., Lehigh at Main, Morton Grove, Ill.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Jefferson Electric Co., 25th & Madison St., Bellwood, Ill.
Jefferson Union Co., 607 W. 26th St., New York 1, N. Y.
Jeffrey Mfg. Co., 859 N. Fourth St., Columbus 16, O.
Jenkins Bros., 100 Park Ave., New York 17, N. Y.
Jenn-Air Products Co., 409 Architects Bldg., Indianapolis 4, Ind.
Jennison Co., 87 Putnam St., Fitchburg, Mass.
Jerry Finn Engineers, 634 Grand Ave., St. Paul 5, Minn.
Jessop Steel Co., Washington, Pa.
Jet-Lube, Inc., 7358 Beverly Blvd., Los Angeles, Calif.
Jewel Mfg. Co., 1841 University Ave., St. Paul 4, Minn.
Johns-Manville, 22 E. 40th St., New York 16, N. Y.
Johnson Bronze Co., 460 S. Mill St., New Castle, Pa.
Johnson Co., S. T., Church Rd., Bridgeport, Pa.
Johnson Corp., The, 806 Wood St., Three Rivers, Mich.
Johnson Gas Appliance Co., 520 "E" Ave., N. W., Cedar Rapids, Ia.
Johnson Heater Corp., 1 Winnisimet St., Chelsea, Mass.
Johnson Machine Works, 619 Menomonie St., Eau Claire, Wis.
Johnson March, 1724 Chestnut St., Philadelphia 3, Pa.
Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Johnson Metal Hose, Inc., 10 Sperry St., Waterbury 20, Conn.
Johnson Service Co. 507 E. Michigan St., Milwaukee 2, Wis.
Johnson-Williams Ltd., 2625 Third St., Palo Alto, Calif.
Johnston Bros., Inc., Ferrysburg, Mich.
Johnston & Chapman Co., 2925 Carroll Ave., Chicago 12, Ill.
Johnston & Jennings Co., 6917 Bessemer Ave., Cleveland 27, O.
Johnston Foil Mfg. Co. 6100 S. Broadway, St. Louis 11, Mo.
Johnston Pump Co., 3272 E. Foothill Bldg., Pasadena 19, Calif.
Jones Foundry & Machine Co., W. A., 4401 Roosevelt Rd. Chicago
Jones & Laughlin Steel Corp., 3 Gateway Center, Pittsburgh 30, Pa.
Jordan & Co., Inc., Paul R., 311 E. South St., Indianapolis 25, Ind.
Jordon Refrigerator Co., Inc., 58th & Grays Ave., Philadelphia 43, Pa.
Jordan Regulator Corp., 100 W. Mulberry St., Lebanon, O.
Joy Mfg. Co., Dept. 20, Henry W. Oliver Bldg., Pittsburgh 22, Pa.
Justrite Mfg. Co., 2061 N. Southport Ave., Chicago 14, Ill.
Justus Steam Trap Co., Napanoch, N. Y.

K

Kainer & Co., 763 W. Lexington St., Chicago 7, Ill.
Kaiser Aluminum & Chemical Corp., 1924 Broadway, Oakland 12, Calif.
Kaiser Co., E. B., 2114 W. Lake Ave., P. O. Box 276, Glenview, Ill.
Kaiser Co. H. S. 1336 Franklin Blvd., Chicago, Ill.
Kalamazoo Tank & Silo Co., Machine Tool Div., 500 Harrison St., Kalamazoo 16, Mich.
Kane Mfg. Corp., Kane, Pa.
Kasson Die & Motors Corp., 262-272 Mott St., New York 12, N. Y.
Kates Co., W. A., The, 430 Waukegan Rd., Deerfield, Ill.
Kauffman Air Conditioning Corp., 4505 Olive St., St. Louis 8, Mo.
Kaufman Co. H. J., The, 13215 Roselawn Ave., Detroit 4, Mich.
Kaul Clay Mfg. Co., The, Toronto, O.
Kaustine Furnace & Tank Corp., 1492 Washington Ave., Perry, N. Y.
Kawneer Co., Niles, Mich.
Kaye & McDonald, Inc., 11-15 Central Ave., West Orange, N. J.
Kaylo Div., Owens-Illinois Glass Co., Box 1035, Toledo 1, O.
Keasbey Co., Robert A., 139-149 W. 19th St., New York, N. Y.
Keasbey & Mattison Co., Butler Ave., Ambler, Pa.
Keckley Co., O. C., 400 W. Madison St., Chicago 6, Ill.
Keeler Co., E., 238 West St., Williamsport 3, Pa.
Keeney Mfg. Co., Main St., Newington 11, Conn.
Kehm Corp., The, 5000 S. Halsted St., Chicago, Ill.
Keller Tool Co., P. O. Box 268, Grand Haven, Mich.
Kelley Koett Mfg. Co., The, 212 W. 4th St., Covington, Ky.
Kellogg Co., M. W., The, 225 Broadway, New York 7, N. Y.
Kelvinator Div., Nash-Kelvinator Corp., 14250 Plymouth Rd., Detroit 32, Mich.
Kemp Mfg. Co., C. M., 405 E. Oliver St., Baltimore, Md.
Kenco Pump Co., 1125 North Ridge Rd., Lorain, O.
Kenite Laboratory, Inc., 23 Samson Ave., P. O. Box 268, Madison, N. J.
Kenmore Machine Products, Inc., 15 Depew Ave., Lyons, N. Y.
Kennard Corp., 1819 S. Hanley Rd., St. Louis 17, Mo.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kenney Co., L. C., 2300 W. 59th St., Chicago 36, Ill.
Kensico Tube Co., Mt. Kisco, N. Y.
Kent-Moore Organization, General Motors Bldg., Detroit, Mich.
Ken-Way Corp., Sparta, Wis.
Kerentoff, G. L., 2218 Reading Rd., Cincinnati 2, O.
Kern Co., John A., 224 N. Loomis St., Chicago 7, Ill.
Kerotest Mfg. Co., 2525 Liberty Ave., Pittsburgh 22, Pa.
Kester Solder Co., 4201 Wrightwood Ave., Chicago 39, Ill.

Kewanee-Ross Corp., 101 Franklin St., Kewanee, Ill.
Kewaunee Mfg. Co., Adrian, Mich.
Key Co., 2617 McCasland, East St. Louis, Ill.
Keystone Asphalt Products Co., 101 E. Ontario St., Chicago 11, Ill.
Keystone Carbon Co., Inc., 1935 State St.. St. Marys. Pa.
Keystone Tool Corp., P. O. Box 6716, Houston 5, Tex.
Kidder Mfg. Co., Inc., J. F., 426 Colchester Ave., Burlington, Vt.
Kieley & Mueller, Inc., 64 Genung St., Middletown, N. Y.
Kilbury Mfg. Co., Inc., 14529 Hawthorne Blvd., Lawndale, Calif.
Kilgore Mfg. Co., Westerville, O.
Kimberly-Clark Corp., Neenah, Wis.
Kindl-Air Corp., 1480 W. 112th St., Cleveland, Ohio
King Co., The, 928 N. Cedar St., Owatonna, Minn.
King Engineering Corp., 945 Willard Ave., Ann Arbor, Mich.
King Union Co., Inc., Hillsgrove, R. I.
Kingsford Foundry & Machine Wks., 264 W. Second St., Oswego, N. Y.
Kingston Products Corp., 1415 N. Webster, Kokomo, Ind.
Kinney Mfg. Co., 3529 Washington St., Boston 30, Mass.
Kirk & Blum Mfg. Co., 3120 Forrer St., Cincinnati 9, O.
Kisco Boiler & Engineering Co., 2414 Dekalb St., St. Louis 4, Mo.
Klauer Mfg. Co., 9th and Washington Sts., Dubuque, Ia.
Kleenaire Corp., 409 Jefferson St., Stevens Point, Wis.
Kleen-Heet, Inc., 1823 Carroll Ave., Chicago 12, Ill.
Klenk's Aviation Snips, 107 E. 5th St., Wilmington, Del.
Kling Bros., Engineering Works, 1320 N. Kostner Ave., Chicago 51, Ill.
Klipfel Valves, Inc., 1075 Lincoln Ave., Hamilton, O.
Kluegel & Co., E., 187 W. Kellogg Blvd., St. Paul, Minn.
Knapp Bros. Mfg. Co., Inc., 16 East 72nd St., Cincinnati 16, O.
Knight, Maurice A., Kelly Ave., Akron 9, O.
Knowles Mushroom Ventilator Co., 583 Upper Mountain Ave., Upper Montclair, N. J.
Knuth Engineering Co., 2617 N. St. Louis, Chicago, Ill.
Kobe Inc., Div. of Dresser Equipment Co., Huntington Park, Calif.
Kody Blower Co., 1150 Southard St., Trenton 5, N. J.
Kol-Master Corp., 161 Walberg St., Oregon, Ill.
Kool-Kar Co., Inc., 1468 Penobscot Bldg., Detroit, Mich.
Kool-Sleep, Inc.. Cambridge, O.
Kopperman & Sons, Joseph, 316 New St., Philadelphia 6, Pa.
Koppers Co., Inc., Koppers Bldg., Pittsburgh 19, Pa.
Koppers Co., Inc., Metal Products Div., 200 Scott St., Baltimore 3, Md.
Korfund Co., Inc., 48-01-F 32nd Pl., Long Island City 1, N. Y.
Koven & Bro., L. O., Inc., 154 Ogden Ave., Jersey City 7, N. J.
Kraissl Co., Inc., The, Terhune and Williams Aves., Hackensack, N. J.
Kramer Trenton Co., N. Olden & Breunig Aves., Trenton 5, N. J.
Kraus Co., Walter S., 48-02 43rd St., Woodside 77, N. Y.
Krehbiel Co., J. H., 425 N. Crawford Ave., Chicago, Ill.
Kritzer Radiant Coils, Inc., 2901 W. Lawrence Ave., Chicago 25, Ill.
Krueger Air Conditioning Co., 19 E. Rillito St., Tucson, Ariz.
Krueger Sentry Gauge Co., 1056 W. Mason St., Green Bay, Wis.
Kuhns Bros. Co., 1800 McCall St., Dayton 8, O.
Kunkle Valve Co., 121 S. Clinton St., Ft. Wayne 2, Ind.
Kwikon Co., 1850 W. Washington, Chicago 12, Ill.

L

LaBour Co., Inc., The, 1301 Sterling Ave., Elkhart, Ind.
Laclede-Christy Co., Arcade Bldg., St. Louis 1, Mo.
Laclede Steel Co., Arcade Bldg., Rm. 1317, St. Louis 1, Mo.
Laclede Stoker Co., 4438 Hunt Ave., St. Louis 10, Mo.
La Crosse Steel Roofing & Corrugating Co., 227 Jay St., La Crosse, Wis.
Ladish Co., 5300 S. Packard Ave., Cudahy, Wis. (Milwaukee Suburb).
Laharco Industries, 721-2nd Ave., N., Minneapolis 5, Minn.
Lake Chemical Co., 3052 W. Carroll Ave., Chicago 12, Ill.
Lakewood Engineering & Mfg. Co., 1756 W. Lake St., Chicago 12, Ill.
Lamb Electric Co., Kent, O.
Lammert & Mann Co., Wood & Walnut Sts., Chicago 12, Ill.
Lamson Corp., Blower Div., Syracuse 1, N. Y.
Lamson & Sessions Co., 1971 W. 85th St., Cleveland, O.
Lancaster Heat Transfer Co., Inc.. 123 DeKalb Ave., Brooklyn. N. Y.
Lancaster Pump & Mfg. Co., Manheim Rd., Lancaster, Pa.
Landis & Gyr, Inc., 45 W. 45th St., New York 36, N. Y.
Landis Machine Co., Inc., Fifth and Church Sts., Waynesboro, Pa.
Lane Shur-Grip Tool Co., 1420 S. Michigan Ave., Chicago 5, Ill.
Larkin Coils, Inc., 519 Memorial Dr., S. E., Atlanta 1, Ga.
Larkin Packer Co., Inc., 6200 Maple Ave., St. Louis 14, Mo.
Lastik Products Co., Inc., 203 Iroquois Bldg.. Pittsburgh 13, Pa.
Lattner Mfg. Co., P. M., 1411-9th St., S. W., Cedar Rapids, Iowa
Lau Blower Co., 2001 Home Ave., Dayton 7, O.
Lawler Automatic Controls, Inc., 453 N. MacQuesten Pkwy., Mount Vernon, N. Y.
Lawrence Pumps Inc., 371 Market St., Lawrence, Mass.
Lawrence Pump & Engine Co., P. O. Box 70, Lawrence, Mass.
Layne & Bowler, Inc., Box No. 6697, Hollywood Sta., Memphis 8, Tenn.
Leach Relay Co., 5919 Avalon Blvd., Los Angeles 3, Calif.
Lead Lined Iron Pipe Co., 1 Broadway, Wakefield, Mass.
Leahy Mfg. Co., Los Angeles, Calif.
Leavitt Machine Co., East River St., Orange, Mass.
Lecourtenay Co., 5 Maine St., Newark 5, N. J.
Ledeen Mfg. Co., 1600 S. San Pedro St., Los Angeles 15, Calif.
Lee Co., K. O., Aberdeen, S. D.
Lee Corp., 1011 Tatnall St., Wilmington, Del.
Lee-Don Inc., Grant Bldg., Pittsburgh 19, Pa.
Lee & Son, Thomas, 128-132 W. Second St., Cincinnati 2, O.
Lee Vine Fin-Tube Radiator Co., Inc., 10 Fair St., New Haven, Conn.
Leeds & Northrup Co., 4970 Stenton Ave., Philadelphia 44, Pa.
Lees, John, Div., The, Serrick Corp., Batavia St. and Kilgore Ave., Muncie, Ind.
Leffel & Co., James, 426 East St., Springfield, O.
Lehigh Fan & Blower Co., 17th and Sumner Ave., Allentown, Pa.
Lehigh Mfg. Co., Div. of Lehigh Foundries, Inc., Lancaster, Pa.
Leibfried Mfg. Corp., C. H., 95 Guernsey, Brooklyn, N. Y.
Leiman Bros., Inc., 163 W. Christie St., Newark, N. J.
Leland Electric Co., The, Div. of American Machine & Foundry Co., 1501 Webster St., Dayton 1, O.
Lenk Mfg. Co., 30 Cummington St., Boston 15, Mass.
Lennox Furnace Co., Marshalltown, Ia.
Leonard Valve Co., 1360 Elmwood Ave., Cranston 9, R. I.
Leslie Co., 237 Grant Ave., Lyndhurst, N. J.
Leslie Welding Co., Inc., 2943 Carroll Ave., Chicago 12, Ill.
Lexington Supply Co., 4815 Lexington Ave., Cleveland 3, O.
Levow, David, 308 W. 20th St., New York 11, N. Y.
Lewellen Mfg. Co., Columbus, Ind.
Lewin-Mathes Co., Lewin Metals Div., 1111 Chouteau Ave., St. Louis 2, Mo.
Lewis & Co., Inc., Chas. S., 2207 Pine St., St. Louis 3, Mo.
Lewis & Co., Joseph E., 1319 Carroll St., Baltimore, Md.
Lexsuco, Inc., 4815 Lexington Ave., Cleveland 3, O.
Leyman Mfg. Corp., John H. McGowan Co. Div., 1416 First National Bank Bldg., Cincinnati 2, O.
Libbey-Owens-Ford Glass Co., Nicholas Bldg., Toledo 3, O.
Libert Machine Co., 324 N. Roosevelt St., Green Bay, Wis.
Lieblich Oil Burner Inc., 36 W. 66th St., New York, N. Y.
Lientz Co., B. P., P. O. Box 2275, Kansas City, Mo.
Lilie-Hoffmann Cooling Towers, Inc., 4239 Duncan Ave., St. Louis 10, Mo.
Lima Electric Motor Co., The, Lima, O.
Lima Register Co., The, 651 N. Baxter St., Lima, O.
Lincoln Electric Co., The, 22801 St. Clair Ave., Cleveland 17, O.
Linde Air Products Co., A Div. of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Lindsay Structure, Inc., 5000 W. Dempster St., Skokie, Ill.
Lindy Heaters, Inc., 2370 Hoffman St., New York 58, N. Y.
Linear Incorporated, N. W. Cor. State Rd. & Levick St., Philadelphia 35, Pa.
Link-Belt Co., 307 N. Michigan Ave., Chicago 1; 2045 W. Hunting Park Ave., Philadelphia 40, Pa.
Lintern Corp., Route 20 East, Painesville, O.
Lipman Refrigeration Div., Yates-American Co., Beloit, Wis.
Liquid Carbonic Corp., 3100 S. Kedzie Ave., Chicago 23, Ill.
Liquidepth Indicators, Inc., 43-22 Tenth St., Long Island City 1, N. Y.
Liquidometer Corp., 37-15 Skillman Ave., Long Island City 1, N. Y.
Lissberger & Son, Inc., Marks, 23-01 Borden Ave., Long Island City, N. Y.
Lithcote Corp., 333 W. 40th Pl., Chicago 9, Ill.
Little Giant Vaporizer Co., Inc., 5105 Classen Blvd., P. O. Box 3535, Oklahoma City 6, Okla.
Little Mfg. Co., M. S., 151 New Park Ave., Hartford 6, Conn.
Littleford Bros., Inc., 453 E. Pearl St., Cincinnati 2, O.
Livesay Window Co., 3044 S. W. 28th Lane, Miami, Fla.
Livingstone Engineering Co., 100 Grove St., Worcester 5, Mass.
Locke Regulator Co., Walter and Osborne Sts., Salem, Mass.
Lockformer Co., The, 4615 W. Roosevelt Rd., Chicago 50, Ill.
Lockjoint Wood Products Co., 1114 S. Sante Fe, Wichita 11, Kan.
Locknut Corp. of America, 3403 W. 47th St., Chicago 32, Ill.
Lockport Cotton Batting Co., Lockport, N. Y.
Logan Clay Products Co., The, Logan, O.
Logan Engineering Co., Lawrence & Lamon Ave., Chicago 30, Ill.
London Chemical Co., 325 W. 32nd St., Chicago, Ill.
Lonergan Mfg. Co., Edison & Clark Sts., Albion, Mich.
Longergan Co., J. E., 2nd and Race Sts., Philadelphia 6, Pa.
Lookout Boiler & Mfg. Co., Compress St. & Mfrs. Rd., Chattanooga 1, Tenn.
Lord Mfg. Co., 1635 W. 12th St., Erie, Pa.
Lord & Clark Co., Inc., 69 Tencan St., Boston 22, Mass.
Louisville Drying Machinery Unit, General American Transportation Corp., 139 So. 4th St., Louisville 2, Ky.
Louvra Corp., The, 1010 Jeanette Ave., Union, N. J.
Lovejoy Flexible Coupling Co., 5081 W. Lake St., Chicago 44, Ill.
Lowell Wrench Co., 54 Commercial St., Worcester 8, Mass.
Loyal Knight Stokers, Inc., 800 Scheel St., Belleville, Ill.
Ludlow Valve Mfg. Co., Inc., Foot of Adams St., Troy, N. Y.
Lufkin Rule Co., Saginaw, Mich.
Lug-All Co., The, Wynnewood 29, Pa.
Lukens Steel Co. and Divisions, 308 S. First Ave.. Coatesville, Pa.
Luminous Ceilings, Inc., 2500 W. North Ave., Chicago 47, Ill.
Lumm Co., A. H., 2512 Albion St., Toledo 6, O.
Lumsden & Van Stone, Div. of Midwest Piping & Supply Co., 426 First St., South Boston 27, Mass.
Lunkenheimer Co., Waverly & Beekman Sts., Cincinnati 14, O.
Lurie & Lurie, 126 N. Union St., Chicago, Ill.
Lustra Corp. of America, 36 Washington St., Brooklyn, N. Y.
Luzerne Rubber Co., Muirhead Ave., Trenton 7, N. J.
Lynch Asbestos Co., 2939 So. Sunol Drive, Los Angeles 23, Calif.
Lynch Corp., Crystal & Ames St., Anderson, Ind.
Lynchburg Foundry Co., Peoples Bank Bldg., Lynchburg, Va.
Lyon, Conklin & Co., Inc., McComas & Race Sts., Baltimore 30, Md.

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M B Mfg. Co., Inc., The. 1060 State St., New Haven 11, Conn.
M & E Mfg. Co., 2757 Winthrop Ave., Indianapolis, Ind.
M-M-A, Inc., Breneman Bldg., Lancaster, Pa.

Maas & Waldstein Co., 2121 McCarter Highway, Newark 4, N. J.
MacDermid Chemical Co., Box 1041, Bristol, Conn.
Macksons Co., 125 Cedar St., New York 6, N. Y.
Mac-Lean-Fogg Lock Nut Co., 5535 N. Wolcott Ave., Chicago 40, Ill
Madden Corp., The, 1543 Morse Ave., Chicago, Ill.
Madden Brass Products Co., 1111 N. Franklin St., Chicago 10, Ill.
Magic Chef, Inc., 1641 S. Kingshighway Blvd., St. Louis 10, Mo.
MaGirl Foundry & Furnace Co., 413 E. Oakland Ave., Bloomington, Ill.
Magnaflow Pump Corp., 45 Astor Place, New York 3, N. Y.
Magna-Rod, Box 736, Beloit, Wis.
Magnetic Drain Plug Co., Wellington, O.
Magnetrol, Inc., 2110 S. Marshall Blvd., Chicago 23, Ill.
Magnex Corp., 90-28 Van Wyck Expressway, Jamaica 18, N. Y.
Magnode Products, Inc., Box 292, Trenton, O.
Magnus Chemical Co., South Ave., Garwood, N. J.
Mahon Co., R. C., The, P. O. Box 4666, Detroit 34, Mich.
Mahr Mfg. Co., Div. of Diamond Iron Wks., Inc., 1728 Second St N., Minneapolis 11, Minn.
Maid-O'-Mist, Inc., 3217 N. Pulaski Rd., Chicago 41, Ill.
Maintenance Engineering Corp., 3611 Clinton Dr., Houston, Tex.
Majot Automatic Machine Co., Inc., 88 Main St., East Orange, N. J
Mall Tool Co., 7740 South Chicago Ave., Chicago 19, Ill.
Malleable Iron Fittings Co., Branford, Conn.
Mallory Sales Co., 13904 Lincoln Ave., Dolton, Ill.
Manhattan Perforated Metal Co., Inc., 43-17 37th St., Long Island City 1, N. Y.
Manheim Mfg. & Belting Co., Manheim, Pa.
Manitowoc Shipbuilding, Inc., 16th & The River, Manitowoc, Wis.
Manning & Lewis Engineering Co., 32 Ogden St., Newark 4, N. Y.
Manning, Maxwell & Moore, Inc., 250 East Main St., Stratford, Conn.
Mansfield & Green, 1051 Power Ave., Cleveland 14, O.
Manufacturers Corp., 100 W. 4th St., Mansfield, O.
Maplewood Machinery Co., Inc., 2634 Fullerton Ave., Chicago 47, Ill.
Marathon Electric Mfg. Corp., Cherry and Randolph Sts., P. O. Box 630, Wausau, Wis.
Marble-Card Electric Co., Gladstone, Mich.
Marco Co., Inc., 3rd & Church Sts., Wilmington 50, Del.
Marco Industries, Inc., 786 Terrace Blvd., Depew, N. Y.
Marine & Industrial Products Co., 3731 Filbert St., Philadelphia 4.
Marion Machine Foundry & Supply Co., Marion, Ind.
Markal Co., 3052 W. Carroll Ave., Chicago 12, Ill.
Marley Co., Inc., The, 222 West Gregory Blvd., Kansas City 5, Mo.
Marlin-Rockwell Corp., Jamestown, N. Y.
Marlo Coil Co., 6135 Manchester Rd., St. Louis 10, Mo.
Marlow Pumps, Subsidiary of Bell & Gossett Co., Ridgewood, N. J.
Marman Products Co., Inc., 11214 Exposition Blvd., Los Angeles 64.
Marquart Mfg. Co., 1241 High St., Oakland 1, Calif.
Marquette Coppersmithing Co., Christian & Water Sts., Philadelphia 47, Pa.
Marquette Mfg. Co., 307 E. Hennepin Ave., Minneapolis 14, Minn.
Marsh Heating Equipment Co., 3501 Howard St., Skokie, Ill.
Marsh Instrument Co., 3501 Howard St., Skokie, Ill.
Marsh Valve Co., 4th St., & Brigham Rd., Dunkirk, N. Y.
Marshalltown Mfg. Co., 901 E. Nevada, Marshalltown, Ia.
Martens & Stormoen, 231 Willard St., West Quincy 69, Mass.
Martin Co., Inc., J. O., 637 Minna St., San Francisco 3, Calif.
Martin Fan & Blower Co., 4634 W. 21st Pl., Chicago 50, Ill.
Martin & Sons, H. P., 801 W. 12th St., Owensboro, Ky.
Martin Metal Products Corp., Ferndale, Mich.
Marvel Engineering Co., 625 W. Jackson Blvd., Chicago, Ill.
Masonite Corp., 111 W. Washington St., Chicago 2, Ill.
Mason-Neilan Regulator Co., 1190 Adams St., Boston 24, Mass.
Mass Co., 1123 W. 4½ St., Davenport, Ia.
Master Control Co., The, 2034 Fifth St., Cuyahoga Falls, O.
Mastercraft Plastics Co., 95-01 150th St., Jamaica 35, N. Y.
Master Electric Co., 126 Davis Ave., Dayton 1, O.
Master Enterprise Corp. of America, Boulder Bldg., Tulsa, Okla.
Master Mechanics Co., 2097 Columbus, Cleveland, O.
Matthiessen & Hegeler Zinc Co., 9th & Sterling Sts., La Salle, Ill.
Maurath, Inc., 21800 Miles Ave., Cleveland 22, O.
Maurey Mfg. Corp., 2911 S. Wabash Ave., Chicago 16, Ill.
Maxitrol Co., 12200 Beech Rd., Detroit 28, Mich.
May Oil Burner Div., May Fuel Oil Corp., 1500 Russell St., Baltimore
Mayer Refrigerating Engineers, Inc., Rutherford, N. J.
Mayne Products Co., 324 Harries Bldg., Dayton 2, O.
Mayson Mfg. Co., 4332 Horatio St., Detroit 10, Mich.
Maysteel Products, Inc., 740 N. Plankinton, Milwaukee 3, Wis.
McAlear Mfg. Co., 1921 S. Western Ave., Chicago 8, Ill.
McAuley Trap Co., 104 First Ave., Pittsburgh 22, Pa.
McCord Corp., 2587 E. Grand Blvd., Detroit 11, Mich.
McCorkle Co., D. H., 6th & Bancroft Way, Berkeley 2, Calif.
McCoy Products Co., Inc., 420 Felt Bldg., Salt Lake City 1, Utah
McDonnell & Miller, Inc., 3500 N. Spaulding Ave., Chicago 18, Ill
McGraw Electric Co., Clark Div., 5201 W. 65th St., Chicago 28, Ill.
McIntire Co., The, Okner Parkway, P. O. Box 5, Livingston, N. J.
McIntyre Engineering Co., Inc., 137 S. Linden Ave., South San Francisco, Calif.
McKay Co., 1005 Liberty Ave., Pittsburgh 22, Pa.
McLarty Systems, 2600 Dickman Rd., Battle Creek, Mich.
McNeill Engineering Co., 4057 W. Van Buren St., Chicago 24, Ill.
McPherson Furnace & Supply Co., 1805 N. E. Second Ave., Portland 12, Ore.
McQuay, Inc., 1600 Broadway, N. E., Minneapolis 13, Minn.
McQuay-Norris Mfg. Co., Southwest Ave. at Marconi, St. Louis 10, Mo.
McRae Corp., 621 S. Spring St., Los Angeles 14, Calif.
McRay Products Co., 950 Mission St., South Pasadena 1, Calif.
McWane Cast Iron Pipe Co., 1201 Vanderbilt Rd., Birmingham 2, Ala.
Mears-Kane-Ofeldt, Inc., Div. S. T. Johnson Co., P. O. Box 223, Bridgeport, Pa.
Mechanical Industries Production Co., 217-223 Ash St., Akron 2, O.
Mechanical Products Corp., 168 N. Ogden Ave., Chicago 7, Ill.
Meco, Inc., 4101 S. E. 26th Ave., Portland 2, Ore.
Medart Co., 100 Potomac St., St. Louis 18, Mo.
Mefco Mfg. Co., Air Conditioning Div., 1505 Gardena Ave., Glendale 4, Calif.
Meier Electric & Machine Co., Inc., 3525 E. Washington St., Indianapolis 7, Ind.
Mel-Gauge Co., P. O. Box 126, Sta. A, New Haven, Conn.
Mel Products Co., The, 554 Chapel St., New Haven, Conn.
Meldon Industries Div., Tool Industries, Inc., 15438 Telegraph Rd., Detroit, Mich.
Mellish & Murray Co., 1715 Carroll Ave., Chicago 12, Ill.
Memphis Pump & Mfg. Co., Memphis, Tenn.
Menardi & Co., 1222 E. Grand Ave., El Segundo, Calif.
Merchant & Evans Co., 2035 Washington Ave., Philadelphia 46, Pa.
Mercoid Corp., The, 4201 Belmont Ave., Chicago 41, Ill.
Mercury Clutch Div., Automatic Steel Products, Inc., Canton 6, O.
Meriam Instrument Co., The, 10920 Madison Ave., Cleveland 2, O.
Mesker Steel Corp., Geo. L., 400 N. W. First St., Evansville 8, Ind.
Metalcraft Inc., Mason City, Ia.
Metal Fabricators, Inc., P. O. Box 3232, Charlotte 3, N. C.
Metal & Thermit Corp., 100 E. 42nd St., New York 17, N. Y.
Metallo Gasket Co., 16 Bethany St., New Brunswick, N. J.
Metropolitan Refining Co., Inc., 50-23 Twenty-Third St., Long Island City 1, N. Y.
Mettler Co., Inc., The, 4366 Worth St., Los Angeles 16, Calif.
Meyer & Bro. Co., F., 308 S. Commercial St., Peoria 2, Ill.
Meyer Furnace Co., The, P. O. Box 989, Peoria 1, Ill.
Meyer & Wenthe, Inc., 30 S. Jefferson St., Chicago, Ill.
Michigan Pipe Co., 506 Phoenix Bldg., Bay City, Mich.
Michigan Plastic Pipe Co., 20050 Livernois St., Detroit, Mich.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit, Mich.
Micro Div. of Minneapolis-Honeywell Regulator Co., 1 E. Spring St., Freeport, Ill.
Micro Metallic Corp., 30 Sea Cliff Ave., Glen Cove, N. Y.
Micro Products Co., 20 N. Wacker Dr., Chicago 6, Ill.
Midco Register Corp., 1059 Grand Ave., St. Paul, Minn.
Mid-Continent Metal Products Co., 1960 Clybourn Ave., Chicago 14, Ill.
Midland Paint & Varnish Co., 3802 E. 91st St., Cleveland 5, O.
Mid-States Welder Mfg. Co., 6025 S. Ashland Ave., Chicago 36, Ill.
Midwest Automatic Control Co., 510 Third St., Des Moines, Ia.
Midwest Mfg. Co., 2205 Haskell Ave., Lawrence, Kans.
Midwest Piping Co., Inc., 1450 S. Second St., St. Louis 4, Mo.
Midwest Products Co., Port Byron, Ill.
Miller Electric Mfg. Co., Inc., 718 S. Bounds St., Appleton, Wis.
Miller-Harris Instrument Co., 601 E. Ogden Ave., Milwaukee 2, Wis.
Millers Falls Co., 57 Wells St., Greenfield, Mass.
Mill-Rose Co., 1985 E. 59th St., Cleveland, O.
Mills Corp., Elmer E., 2930 N. Ashland Ave., Chicago 13, Ill.
Milton Equipment Co., N. E. Cor. 4th Race St., Philadelphia 6, Pa.
Milton Roy Co., 1371 E. Mermaid Ave., Philadelphia 18, Pa.
Milwaukee Electric Tool Corp., 5316 W. State St., Milwaukee 8, Wis.
Milwaukee Gas Specialty Co., P. O. Box 461, Milwaukee, Wis.
Milwaukee Valve Co., S. Burrell St. at E. Hayes Ave., Milwaukee 7, Wis.
Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa.
Mineral Insulation Co., 103rd & Southwest Highway, Chicago Ridge, Ill.
Minerallac Electric Co., 25 N. Peoria St., Chicago 7, Ill.
Minneapolis-Honeywell Regulator Co., 2641 4th Ave., S., Minneapolis 8, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Wayne & Windrim Aves., Philadelphia 44, Pa.
Minnesota Mining & Mfg. Co., 900 Fauquier Ave., St. Paul, Minn.
Minnesota Mining & Mfg. Co., Adhesives & Coatings Div., 411 Piquette, Detroit, Mich.
Minn-Kota Foundry & Mfg. Co., P. O. Box 822, Fargo, N. D.
Miracle Adhesives Corp., 214 E. 53rd St., New York 22, N. Y.
Mir-O-Col Alloy Co., Inc., 308 North Ave., 21, Los Angeles 31, Calif.
Misener Mfg. Co., Inc., 200 8 Walton St., Syracuse 2, N. Y.
Mission Appliance Corp., 12611 Crenshaw Blvd., Hawthorne, Calif
Mississippi Glass Co., St. Louis 7, Mo.
Mitchell Co., John E., 3800 Commerce St., Dallas, Tex.
Mitchell & Co., Inc., W. K., 29th & Ellsworth, Philadelphia 46, Pa
Mitchell Mfg. Co., 2525 N. Clybourn Ave., Chicago, Ill.
Modern Engineering Co., 3411 Pine Blvd., St. Louis 3, Mo.
Modine Mfg. Co., 1509 De Koven Ave., Racine, Wis.
Moeller Instrument Co., 132nd St. & 89th Ave., Richmond Hill 18, N. Y.
Moeschl-Edwards Corrugating Co., Inc., The, P. O. Box 1115, Cincinnati 1, O.
Monarch Mfg. Works, Inc., 2501 E. Ontario St., Philadelphia 34, Pa
Monash-Younker Co., Inc., 1315 W. Congress St., Chicago 7, Ill.
Moncrief Furnace Co., P. O. Box 1673, Atlanta 1, Ga.
Monitor Controller Co., The, 51 Hayward St., Boston 84, Mass.
Monogram Products Co., Inc., 731 N. 35th St., Philadelphia 4, Pa.
Monsanto Chemical Co., 800 N. 12th Blvd., St. Louis 1, Mo.
Monsanto Chemical Co., Merimac Div., Everett Sta., Boston 49, Mass.

Montag Stove & Furnace Wks., 2011 N. Columbia Blvd., Portland 3, Ore.
Montgomery Bros., 1122 Howard St., San Francisco, Calif.
Moore Inc., Goodloe E., 2811 N. Vermilion, Danville, Ill.
Moore Co., The, 810 S. Missouri, Marceline, Mo.
Moore Products Co., H and Lycoming Sts., Philadelphia 24, Pa.
Moraine Products Div., General Motors Corp., Dayton 1, O.
Moran Flexible Joint Co., Inc., 217 W. Main St., Louisville, Ky.
Morehead Mfg. Co., 2455 W. Warren Ave., Detroit 8, Mich.
Moreheat Distribution Inc., 5608 Stewart Rd., Cincinnati 27, O.
Morey, Dan, Box 85, Los Angeles 35, Calif.
Morganite, Inc., Carbon Specialties Div., 3304 48th Ave., Long Island City 1, N. Y.
Morheat Corp., 700 E. Kalamazoo, Lansing, Mich.
Morris Coupling & Clamp Co., 12th and Factory Ave., Elwood City, Pa.
Morris Machine Wks., 50 E. Genesee St., Baldwinsville, N. Y.
Morrison Brothers Co., Dubuque, Ia.
Morrison Products, Inc., E. 168th St. and Waterloo Rd., Cleveland 10, O.
Morse Chain Co., 7601 Central Ave., Detroit 10, Mich.
Morse-Smith-Morse Co., The, 165 Dexter Ave., Watertown 72, Mass
Mortell Co., J. W., Kankakee, Ill.
Morton Engineering Service, Paul S., 609 Bangor Rd., Lawrence, Mich.
Motionair Co., 3319 E. Slauson Blvd., Los Angeles 11, Calif.
Motor Products Corp., Deepfreeze Appliance Div., North Chicago, Ill.
Mt. Hawley Mfg. Co., Inc., Mt. Hawley Air Port, Peoria 4, Ill.
Mountain States Equipment Co., 1238 Speer Blvd., Denver 4, Colo.
Muckle Mfg. Co., Owatonna 3, Minn.
Mueller Brass Co., 1925 Lapeer Ave., Port Huron 1, Mich.
Mueller Co., 512 W. Cerro Gordo St., Decatur, Ill.
Mueller Furnace Co., L. J., 2005 W. Oklahoma Ave., Milwaukee 15, Wis.
Mueller Steam Specialty Co., Inc., 40-20 22nd St., Long Island City 1, N. Y.
Multi-Cell Sales Corp., 3420 Nicollet Ave., Minneapolis 8, Minn.
Multiplex Mfg. Co., Berwick, Pa.
Multi-Vent Div., Pyle-National Co., The, 1373 Kostner Ave., Chicago 51, Ill.
Muncie Gear Wks., Inc., 700 N. Wysor, Muncie, Ind.
Mund Boilers, Inc., 1600 N. Indiana St., Los Angeles 63, Calif.
Mundet Cork Corp., 7101 Tonnelle Ave., North Bergen, N. J.
Mundt & Sons, Charles, 53 Fairmount Ave., Jersey City 4, N. J.
Munn & Steele, Inc., Castle Island Terminal, South Boston, Mass.
Munton Mfg. Co., 9400 Belmont Ave., Franklin Park, Ill.
Muntz T V, Inc., 3150 N. Lincoln, Chicago, Ill.
Murray Co. of Texas, The, P. O. Box 1517, Atlanta, Ga.
Murray Iron Wks. Co., 1106 Washington St., Burlington, Ia.
Murray Mfg. Co., D. J., 1002-24 Third St., Wausau, Wis.
Myers & Bro. Co., F. E., The, Ashland, O.
Myers Electric Co., Inc., 209 First Ave., Pittsburgh 22, Pa.
Mystik Adhesive Products, Div. of Chicago Show Printing Co., 2635 N. Kildare Ave., Chicago 39, Ill.

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Nash Engineering Co., 307 Wilson Ave., South Norwalk, Conn.
Nason Co., Clarkston, Mich.
Nat Corp., 2710 McGee St., Kansas City 8, Mo.
National Acme Co., The, 170 E. 131st St., Cleveland 8, O.
National Air Conditioning Inc., Johnstown, Pa.
National Airoil Burner Co., Inc., 1330 E. Sedgley Ave., Philadelphia 34, Pa.
National Aluminate Corp., 6215 W. 66th Pl., Chicago 38, Ill.
National Aniline Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.
National Carbon Co., Div. of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
National Cork Co., 1 Engle Street, Englewood, N. J.
National Cylinder Gas Co., 840 N. Michigan Ave., Chicago 11, Ill.
National Engineering & Mfg. Co., 16th & Lamiece St., Sedalia, Mo.
National Engineering Products, Inc., Commerce and Savings Bldg., Washington, D. C.
National Gas Equipment Co., Inc., Terrell, Tex.
National Gypsum Co., Delaware Ave., Buffalo, N. Y.
National Heater Co., 2180 Cleora Ave., St. Paul 4, Minn.
National Instrument Laboratories, Inc., 6108 Rhode Island Ave., Riverdale, Md.
National Lead Co., 111 Broadway, New York 6, N. Y.
National Lock Co., Inc., 1902 Seventh St., Rockford, Ill.
National Metal Fabricators, 2138 S. Sawyer, Chicago 23, Ill.
National Meter Co., 4221 First Ave., Brooklyn 32, N. Y.
National Oil Burner Co. of N. Y. Inc., 614 Bergen St., Brooklyn, N. Y.
National Pipe Bending Co., 122 River St., New Haven 13, Conn.
National Pipe Coatings, Inc., 3480 East Randolph St., Huntington Park, Calif.
National Radiator Co., The, 221 Central Ave., Johnstown, Pa.
National Sheet Metal Works, 324 E. 39th St., New York, N. Y.
National Steam Pump Co., 701 W. Johnson St., Upper Sandusky, O.
National Time & Signal Corp., 21800 Wyoming Ave., Detroit 20, Mich.
National Tube Div., United States Steel Corp., 525 William Penn Place, Pittsburgh 30, Pa.
National Valve & Mfg. Co., 3101 Liberty Ave., Pittsburgh 1, Pa.
National Water Lift Inc., Kalamazoo, Mich.
Naugatuck Mfg. Co., Union City, Conn.
Naylor Pipe Co., 1251 E. 92nd St., Chicago 19, Ill.
Nebel Mfg. Co., P. O. Box 3942, Shaker Square Sta., Cleveland 20, O.
Nelson Chemical Pumps, Box 2235, Casper, Wyo.
Nelson Mfg. Co., B. F., 401 Main St., N. E., Minneapolis 13, Minn.
Nelson Stud Welding Div., Gregory Industries, Inc., Lorain, O.
Neptune Meter Co., 50 W. 50th St., New York 20, N. Y.
Nesbitt, Inc., John J., State Rd. & Rhawn St., Philadelphia 36, Pa.
New Departure Div., General Motors Corp., Bristol, Conn.
New England Cooling Tower Co., 80 Freeport St., Boston 22, Mass.
New Haven Copper Co., The, Seymour, Conn.
New Jersey Zinc Sales Co., Front & Fletcher Sts., New York 7, N. Y.
New York Air Valve Corp., 1850 Atlantic Ave., Brooklyn 33, N. Y.
New York Belting & Packing Co., 1 Market St., Passaic, N. J.
New York Blower Co., 3159 Shields Ave., Chicago 16, Ill.
New York Brass Foundry, 405 Broome St., New York 13, N. Y.
Newark Controls Co., 15 Ward St., Bloomfield, N. J.
Newark Wire Cloth Co., 351 Verona Ave., Newark 4, N. J.
Newcomb-Detroit Co., 5741 Russell St., Detroit 11, Mich.
Newco Products, 30 E. 40th St., New York 16, N. Y.
Newport Steel Corp., Ninth & Lowell Sts., Newport, Ky.
Niagara Blower Co., 405 Lexington Ave., Room 3117, New York 17.
Niagara Industrial Corp., 20 Vesey St., New York 7, N. Y.
Niagara Machine & Tool Wks., 637-697 Northland Ave., Buffalo 11, N. Y.
Nice Ball Bearing Co., 30th and Hunting Park Ave., Philadelphia 40.
Nicholson & Co., W. H., 178 Oregon St., Wilkes-Barre, Pa.
Nikoh Tube Co., 5000 S. Whipple, Chicago 32, Ill.
Niles Rolling Mill Div., Sharon Steel Corp., Niles, O.
Noera Mfg. Co., Div. Chase Brass & Copper Co., Waterbury 20, Conn.
Nooter Corp., 1400 S. Second St., St. Louis 4, Mo.
Nordstrom Valve Div., Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.
Norge Heat Div., Borg-Warner Corp., 346 E. South St., Kalamazoo, Mich.
Norgren Co., C. A., 3400 So. Elati St., Englewood, Colo.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
Norman Products Co., Inc., 1150 Chesapeake Ave., Columbus, O.
Norristown Magnesia & Asbestos Co., Washington St., Norristown, Pa.
Norse Boiler Co., Inc., New Market, N. J.
North American Mfg. Co., 4455 E. 71st St., Cleveland 5, O.
North American Mogul Products Co., The, Standard Bldg., Cleveland 13, O.
North American Philips Co., Inc., 750 S. Fulton Ave., Mt. Vernon, N. Y.
North Penn Co., 38 E. 21st St., New York 10, N. Y.
Northern Blower Co., 6428 Barberton Ave., Cleveland 2, O.
Northern Indiana Brass Co., 935 Plum St., Elkhart, Ind.
Northern Steel & Stoker Corp., 3100 Prospect Rd., Peoria 4, Ill.
Northwest Lead Co., 2700 16th Ave., S. W., Seattle 4, Wash.
Norton Co., 1 New Bond, Worcester 6, Mass.
Norwalk Valve Co., South Norwalk, Conn.
Norwood Associated Engineers Inc., 904 Columbus Ave., Springfield, Mass.
Nutmeg Chemical Co., 134 Haven St., New Haven, Conn.
Nu-Way Corp., The, 2416 4th Ave., Rock Island, Ill.
Nye Tool Co., 4120-30 Fullerton Ave., Chicago 39, Ill.

O

OPW Corp., 2735 Colerain Ave., Cincinnati 25, O.
Oakite Products, Inc., 19 Rector St., New York 6, N. Y.
Obear & Son, W. F., 6075 So. Normandie, Los Angeles 44, Calif.
Oberdorfer Foundries, Inc., 3007 Thompson Rd., Syracuse, N. Y.
O'Brien Corp., The, South Bend 21, Ind.
O'Brien Industries, P.O. Box 72, Caldwell, N. J.
O'Brien Steam Specialty Co., Inc., 712 State-Tower Bldg., Syracuse 2, N. Y.
Octagon Process, Inc., 15 Bank St., Staten Island 1, New York
Octagon Ventilator Co., 5828-30 S. Oakley Ave., Chicago 36, Ill.
Ohio Brass Co., 380 N. Main St., Mansfield, O.
Ohio Electric Mfg. Co., The, 5400 Dunham Rd., Maple Heights, O.
Ohio Foundry & Mfg. Co., Penn R. R. & Slack St., Steubenville, O.
Ohio Injector Co., 275 Main St., Wadsworth, O.
Ohio Pipe Bending & Machine Co., 3900-3910 Trent Ave., Cleveland 9, O.
Ohio Valley Hardware & Roofing Co., Evansville, Ind.
Ohmlac Paint & Refining Co., Inc., 24-13 Bridge Plaza North, Long Island City 1, N. Y.
Oil Equipment Mfg. Corp., 75 Brewster St., New Haven, Conn.
Okadee Co., 322 S. Michigan, Chicago, Ill.
Olsen Testing Machine Co., Tinius, Easton Rd., Willow Grove, Pa.
Olson & Co., Arthur A., Broad St., Canfield, O.
Omega Machine Co., Div. of Builders Iron Foundry, 345 Harris Ave., Providence 1, R. I.
O'Neil-Irwin Mfg. Co., 800 Jefferson, Lake City, Minn.
Orangeburg Mfg. Co., Orangeburg, N. Y.
Ormsby-Osterman, Inc., 3631 Cass Ave., St. Louis 13, Mo.
Orr & Sembower, Inc., Box 1138, Reading, Pa.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Oster Mfg. Co., 2057 E. 61st Pl., Cleveland 3, O.
OverHead Heaters, Inc., 1612 Book Bldg., Detroit 26, Mich.
Owens Co., H., 9300 Venice Blvd., Culver City, Calif.
Owens & Co., Inc., Henry, 51 Washington Ave., Cranston 7, R. I.
Owens-Corning Fiberglas Corp., 1911 Nicholas Bldg., Toledo 1, O.
Oxygen Equipment & Service Co., 8335 S. Halsted St., Chicago 20.
Ozalid Div. of General Aniline & Film Corp., 1505 Ansco Rd., Johnson City, N. Y.
Ozone Air Co., 1132 Division Ave., S., Grand Rapids 7, Mich.

P

Paasche Airbrush Co., 1909 Diversey Parkway, Chicago 14, Ill.
Pabco Products Inc., 475 Brannan St., San Francisco 19, Calif.
Pacific Fittings Div., General Metals Corp., Hollydale, Calif.
Pacific Lumber Co., The, 100 Bush St., San Francisco 4, Calif.
Pacific Machine & Iron Wks., Day Island Waterway, Tacoma, Wash.
Pacific Pumping Co., 9201 San Leandro Blvd., Oakland, Calif.
Pacific States Felt & Mfg. Co., Inc., 845 Howard St., San Francisco.
Pacific Steel Boiler Div., United States Radiator Corp., 300 Buhl Bldg., Detroit 31, Mich.
Pacific Transducer Co., 11921 W. Pico Blvd., Los Angeles 64, Calif.
Pacific Tube Co., 5710 Smithway St., Los Angeles 22, Calif.
Packless Metal Hose, Inc., 31-12 Winthrop Ave., New Rochelle, N. Y.
Paddock Engineering Co. of Texas, 2607 Cedar Springs, Dallas, Tex.
Page Steel & Wire, Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Paine Co., 2 Westgate Rd., Addison, Ill.
Paley Mfg. Corp., 244 Herkimer St., Brooklyn 16, N. Y.
Palmer Electric Co., 20 Sproat St., Detroit 1, Mich.
Palmer Mfg. Corp., 2200 W. Filmore St., Phoenix, Ariz.
Palmer Thermometers, Inc., 2501 Norwood Ave., Cincinnati (Norwood) 12, O.
Palnut Co., 106 Cordier St., Irvington, N. J.
Panelyte Div., St. Regis Paper Co., 230 Park Ave., New York 17, N. Y.
Pangborn Corp., 400 Pangborn Blvd., Hagerstown, Md.
Pan-L-Heat Corp., 2838 N. E. Columbia Blvd., Portland 11, Ore.
Pantex Mfg. Corp., Hydraulics Div., Pawtucket, R. I.
Paragon Electric Co., 1600 Twelfth St., Two Rivers, Wis.
Paragon-Revolute Corp., 61 South Ave., Rochester 4, N. Y.
Parker Appliance Co., The, 17325 Euclid Ave., Cleveland 12, O.
Parker Boiler Mfg. Co., Sid E., 2035 E. 37th St., Los Angeles 58, Calif.
Parker-Kalon Div., General American Transportation Corp., 200 Varick St., New York 14, N. Y.
Parks-Cramer Co., P. O. Box 444, Fitchburg, Mass.
Patco Mfg. Co., 231 N. Bread St., Philadelphia, Pa.
Patrol Valve Co., The, 2310 E. Superior Ave., Cleveland 14, O.
Patterson-Ballagh Corp., 1900 E. 65th St., Los Angeles, Calif.
Patterson-Kelley Co., Inc., The, 730 Burson St., East Stroudsburg, Pa.
Paul-Lewis Laboratories, Inc., 4253 N. Port Washington Rd., Milwaukee 12, Wis.
Paul Valve Corp., 683 Third Ave., New York 17, N. Y.
Payne Furnace Div., Affiliated Gas Equipment, Inc., 801 Royal Oaks Ave., Monrovia, Calif.
Peabody Engineering Corp., 580 Fifth Ave., New York 36, N. Y.
Pease Co., C. F., The, 2601 W. Irving Park Rd., Chicago 18, Ill.
Peck & Harvey, 5650 N. Western Ave., Chicago 45, Ill.
Peck, Stow & Wilcox Co., Center St., Southington, Conn.
Pecora Paint Co., Inc., 4th St., and Penna. R. R., Philadelphia 40, Pa.
Pedrick Tool & Machine Co., 3640 N. Lawrence St., Philadelphia 40, Pa.
Peer, Inc., 1440 Milton St., Benton Harbor, Mich.
Peerless of America, Inc., 2901 Lawrence Ave., Chicago 25, Ill.
Peerless Electric Co., 1401 W. Market St., Warren, O.
Peerless Heater Div., The Eastern Foundry Co., Boyertown, Pa.
Peerless Pump Div., Food Machinery & Chemical Corp., 301 West Ave. 26, Los Angeles 31, Calif.
Penberthy Injector Co., Div. of Buffalo Eclipse Corp., 1242 Holden Ave., Detroit 2, Mich.
Penn Boiler & Burner Mfg. Corp., Lancaster, Pa.
Penn Brass & Copper Co., 3800 W. 20th St., Erie, Pa.
Penn Controls, Inc., P. O. Box 556, Goshen, Ind.
Penn Galvanizing Co., 2201 E. Tioga St., Philadelphia 34, Pa.
Penn Industrial Instrument Corp., 4110 Haverford Ave., Philadelphia 4, Pa.
Penn Mfg. Corp. of Washington, Pa., 380 W. Chestnut St., P. O. Box 484, Washington, Pa.
Penn Ventilator Co., 3252 Goodman, Philadelphia 40, Pa.
Pennant Corp., 200 Grant St., S. W., Grand Rapids 4, Mich.
Pennsylvania Engineering Wks., 526 S. Jefferson St., New Castle, Pa.
Pennsylvania Flexible Metallic Tubing Co., 72nd St. & Powers Lane, Philadelphia 42, Pa.
Pennsylvania Forge Co., Milnor & Bleigh Sts., Philadelphia, Pa.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Pennsylvania Salt Mfg. Co., Widener Bldg., Philadelphia 7, Pa.
% Proportioneers, Inc. %, 381 Harris Ave., Providence 1, R. I.
Perfect Circle Corp., Hagerstown, Md.
Perfection Grate & Stoker Co., 4 Fisk Ave., Springfield 7, Mass.
Perfection Refrigeration Parts Co., Harvey, Ill.
Perfection Stove Co., 7609 Platt Ave., Cleveland 4, O.
Perfex Corp., 500 W. Oklahoma Ave., Milwaukee 7, Wis.
Perkins Machine Co., 4 Perkins Ave., Warren, Mass.
Perkins & Son, Inc., B. F., Chicopee St., Holyoke, Mass.
Permatex Co., Inc., 1702-1720 Avenue Y, Brooklyn 35, N. Y.
Permutit Co., 330 W. 42nd St., New York 18, N. Y.
Perolin Co., Inc., The, 1112 W. 37th St., Chicago 9, Ill.
Peters-Dalton, Inc., 17900 Ryan Rd., Detroit 12, Mich.
Peterson Co., B. A., 300 W. R. R. Ave., Dowagiac, Mich.
Petro, 3170 W. 106th St., Cleveland 11, O.
Pfening Co., Fred D., The, 1075 W. 5th Ave., Columbus 8, O.
Phelps Dodge Copper Products Corp., British American Tube Div., 40 Wall St., New York 5, N. Y.
Phelps Mfg. Co., 715 Thomas St., Little Rock, Ark.
Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.
Philadelphia Gear Works, Inc., Erie Ave. & G St., Philadelphia 34, Pa.
Philadelphia Pipe Bending Co., 4135-65 N. Fifth St., Philadelphia 40.
Philadelphia Pump and Machinery Co., Inc., Wynnewood, Pa.
Philadelphia Thermometer Co., 6th & Cayuga St., Philadelphia 40, Pa.
Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.
Phillips & Co., H. A., 3255 W. Carroll Ave., Chicago 24, Ill.
Phillips Cooling Tower Co., Inc., 220 Dupont St., Brooklyn 22, N. Y.
Phoenix Brass Fittings Corp., 354-378 Coit St., Irvington 11, N. J.
Phoenix Mfg. Co., Joliet, Ill.
Phoenix Products Co., 4715 N. 27th St., Milwaukee 16, Wis.
Phoenix Ventilator Co., Inc., 1665 63rd St., Brooklyn, N. Y.
Photoswitch, Inc., 77 Broadway, Cambridge 42, Mass.
Photovolt Corp., 95 Madison Ave., New York 16, N. Y.
Pick Mfg. Co., West Bend, Wis.
Pierce Co., Wm. B., The, 277 Military Rd., Buffalo 7, N. Y.
Piezo Mfg. Corp., 110 E. 42nd St., New York 17, N. Y.
Pilley Brush Co., Fort Madison, Ia.
Pines Engineering Co., Inc., 685 Walnut St., Aurora, Ill.
Pioneer Pump & Mfg. Co., 19679 John R. St., Detroit 3, Mich.
Pioneer Roofing & Sheet Metal Co., 226 N. Main St., Muskogee, Okla.
Pioneer Tool Co., 1103 Wisconsin Ave., Racine, Wis.
Piping Specialties, Inc., 114 Liberty St., New York 6, N. Y.
Piston Ring Div., Koppers Co., Inc., Bush & Hamburg Sts., Baltimore 3, Md.
Pittsburgh Brass Mfg. Co., 3155 Penn Ave., Pittsburgh, Pa.
Pittsburgh Chemical Laboratories, Inc., 715 Penn Ave., Pittsburgh.
Pittsburgh Corning Corp., 1 Gateway Center, Pittsburgh 22, Pa.
Pittsburgh Lectrodryer Corp., 327 32nd St., Pittsburgh 30, Pa.
Pittsburgh Nipple Wks., Inc., 1455 Spring Garden Ave., Pittsburgh 12, Pa.
Pittsburgh Pipe Coil & Bending Co., 61 Bridge St., Etna Pittsburgh 23, Pa.
Pittsburgh Piping & Equipment Co., 10 43rd St., Pittsburgh 1, Pa.
Pittsburgh Plate Glass Co., 2000 Grant Bldg., Pittsburgh 19, Pa.
Pittsburgh Steel Co., 800 Grant Bldg., Pittsburgh, Pa.
Pittsburgh Tube Co., 212 Wood St., Pittsburgh 22, Pa.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Pittsburg Water Heater Co., Box 4452, Pittsburgh 5, Pa.
Pittsfield Products, Inc., 2275 Platt Rd., Ann Arbor, Mich.
Plasteel Products Co., McAdams Ave., Washington, Pa.
Plastergon Wall Board Co., Philadelphia Ave., Buffalo 7, N. Y.
Plastex Pipe and Extrusion Co., The, 402 Mt. Vernon Ave., Columbus 3, Ohio
Plastic Products Co., 6475 Georgia Ave., Detroit 11, Mich.
Pleasantaire Corp., 734 15th St., Washington 5, D. C.
Plibrico Co., 1800 Kingsbury St., Chicago 14, Ill.
Plumb Mfg. Co., 1925 Dwyer Ave., Utica 3, N. Y.
Plummer Spray Equipment Co., 700 Filmore St., Napoleon, O.
Plymouth Industries, Inc., 1932 Harrison Ave., Plymouth, Ind.
Poe Co., C. W., The 10526 Wilbur Ave., Cleveland 6, O.
Pokorney Mfg. Co., 3117 Clybourn Ave., Chicago, Ill.
Polaire Cooler Co., Inc., P. O. Box 117, El Mirage, Ariz.
Polis Mfg. Co., J. D., 2900-2920 W. 26th St., Chicago 23, Ill.
Polo Pump Co., Polo, Ill.
Polyken Products, Dept. of the Kendall Co., 222 W. Adams St., Chicago 6, Ill.
Poole Foundry & Machine Co., 1700 Union Ave., Woodberry, Baltimore 11, Md.
Porce-Lin Tank Lining Co., 456 Milwaukee, Detroit, Mich.
Porous Plastic Filter Co., Glen Cove, N. Y.
Portable Electric Tools, Inc., 320 W. 83rd St., Chicago 20, Ill.
Porter & Co., Inc., H. W., 825 Frelinghuysen Ave., Newark 5, N. J.
Porter-Cable Machine Co., Syracuse 8, N. Y.
Portmar Boiler Co., Inc., 193 Seventh St., Brooklyn 15, N. Y.
Positive Control Co., The, 2818 Spring Grove Ave., Cincinnati 25, O.
Potter & Brumfield Sales Co., Princeton, Ind.
Potts Co., Horace T., Erie Ave. & "D" St., Philadelphia 34, Pa.
Potts-Farrington Co., 4250 Wissahickon Ave., Philadelphia 29, Pa.
Powder Power Tool Corp., 7526 S. W. Macadam Ave., Portland 1, Ore.
Powder Weld Process Co., The, 419 Kent Ave., Brooklyn, N. Y.
Powell Co., Wm., The, 2525 Spring Grove Ave., Cincinnati 22, O.
Power Engineering Co., 205 West Wacker Dr., Chicago 6, Ill.
Powers Regulator Co., 3400 Oakton St., Skokie, Ill.
Prat-Daniel Corp., 2 Meadow St., South Norwalk, Conn.
Precision Machine Co., 8 Walnut St., Somerville 43, Mass.
Precision Products, Inc., 530 S. Quaker, Tulsa 10, Okla.
Precision Thermometer & Instrument Co., 1506 Brandywine St., Philadelphia 30, Pa.
Precision Welder Mfg. Co., 660 W. Grand Ave., Chicago, Ill.
Preferred Utilities Mfg. Corp., 1860 Broadway, New York 23, N. Y.
Prepo Corp., Edgerton, Wis.
Presstite Engineering Co., 3900 Chouteau St., St. Louis 10, Mo.
Pritchard & Co., J. F., Equipment Div., 210 W. 10th St., Kansas City 5, Mo.
Proctor & Schwartz, Inc., 7th St. and Tabor Rd., Philadelphia 20, Pa.
Producers & Distributors, Inc., 714 S. 6th St., Allentown, Pa.
Products Research Co., 3126 Los Feliz Blvd., Los Angeles 39, Calif.
Propellair Div., Robbins & Myers Inc., 1345 Lagonda Ave., Springfield, O.
Protective Closures Co., 2207 Elmwood Ave., Buffalo 22, N. Y.
Prox Co., Inc., Frank, 1201 S. First St., Terre Haute, Ind.
Puhl & Hepper Mfg. Co., Inc., 6400 W. Florissant Ave., St. Louis 20.
Pullman Vacuum Cleaner Co., 31-39 Allerton St., Boston 19, Mass.
Pur Air Div., Barnebey-Cheney Co., N. Cassady at 8th, Columbus 19, O.
Pure Carbonic, Inc., Div. of Air Reduction Co., Inc., 60 E. 42nd St., New York 17, N. Y.

Purolator Products, Inc., 970 New Brunswick Ave., Rahway, N. J.
Pyle-National Co., The, 1373 N. Kostner Ave., Chicago 51, Ill.
Pyott Foundry & Machine Co., 328 N. Sangamon St., Chicago 7, Ill.
Pypon Co., 410 Frick Bldg., Pittsburgh 19, Pa.
Pyrolite Products Co., 1221-1231 W. 74th St., Cleveland 2, O.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.

Q

Q-P Mfg. Co., Needham Heights, Mass.
Quaid Fabrications, Inc., 157-167 W. Oxford St., Philadelphia 22, Pa.
Quaker City Iron Wks., Allegheny & Tulip St., Philadelphia 34, Pa.
Quaker Rubber Corp., Div. H. K. Porter Co., Inc., Comly & Milnor Sts., Philadelphia 24, Pa.
Quality Specialty Co., Inc., 28th & Lincoln Ave., Camden 5, N. J.
Quickwork Div., Whiting Corp., Harvey, Ill.
Quiet Automatic Oil Burner Corp., 33 Bloomfield Ave., Newark 4, N. J.
Quiet-Heet Mfg. Corp., 46 Oliver St., Newark 5, N. J.
Quigley Co., Inc., 527 Fifth Ave., New York 17, N. Y.
Quik Joint Mfg. Co, 469 E. 159th St., Harvey, Ill.

R

R C S Tool Sales Corp., P. O. Box 1434, Joliet, Ill.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Radex Corp., 2076 N. Elston Ave., Chicago 14, Ill.
Radiant Baseboard Panels, Inc., 900 W. Main St., New Britain, Conn.
Radiant Combustion System, Inc., 342 Madison Ave., New York 17, N. Y.
Radiant Devices, 4030 Chouteau Ave., St. Louis, Mo.
Radiant Heat Engineering, Inc., 1289 N. Fair Oaks, Pasadena 3, Calif.
Radiant Panel Mfg. Co., 9 E. Pearl St., Torrington, Conn.
Radiant-Ray Radiation, Inc., 900 W. Main St., New Britain, Conn.
Radiant Utilities Corp., 8817-18th Ave., Brooklyn 14, N. Y.
Radiator Specialty Co., 1700-1900 Dowd Rd., Charlotte 1, N. C.
Radiator Valve Co. of America, 428 S. 52nd St., Philadelphia 43, Pa.
Radio Corp. of America, RCA Victor Div., Front & Cooper, Camden, N. J.
Radio Corp. of America, Engineering Products Dept., Camden, N. J.
Radioactive Products, Inc., 443 W. Congress St., Detroit 26, Mich.
Raisler Corp., Grimes Sprinkler Div., 129 Amsterdam Ave., New York 23, N. Y.
Ramset Div., Olin Industries, Inc., 12117 Berea Rd., Cleveland 11, O.
Ramsey Chain Co., Inc., 1029 Broadway, Albany 1, N. Y.
Ramtite Co., The, 2563 W. 18th St., Chicago 8, Ill.
Ranco, Inc., 601 W. 5th Ave., Columbus 1, O.
Randall Graphite Bearings, Inc., Greenlawn & Lake Sts., Lima, O.
Ravena Iron Co., Ravena, N. Y.
Rawplug Co., Inc., The, 271 Church St., New York 13, N. Y.
Ray Oil Burner Co., 1301 San Jose Ave., San Francisco 12, Calif.
Raybestos-Manhattan, Inc., 61 Willett St., Passaic, N. J.
Rayfield Co., C. L., 2010-18 S. Halsted St., Chicago 8, Ill.
Raymond Div., Combustion Engineering, Inc., 1324 N. Branch St., Chicago, Ill.
Read Standard Corp., Blower-Stoker Div., York, Pa.
Reading Tube Corp., 36-12 47th Ave., Long Island City, N. Y.
Ready-Power Co., The, 11231 Freud Ave., Detroit 14, Mich.
Reco Products Div., Recony Corp., 150 Nassau St., New York 38, New York.
Rector Insulations, 16 E. 43rd St., New York 17, N. Y.
Red Jacket Co., Inc., 510 Investment Bldg., Pittsburgh, Pa.
Red Spot Electric Co., 7405 S. Tacoma Way, Tacoma 9, Wash.
Redmond Co., Inc., Owosso, Mich.
Reed Mfg. Co., 1436 W. 8th St., Erie, Pa.
Reed Unit-Fans, Inc., 1001 St. Charles Ave., New Orleans 8, La.
Reeves Pully Co., H. P., Columbus, Ind.
Reflectal Corp., 155 E. 44th St., New York 17, N. Y.
Reflin Co., 16825 South Broadway, P. O. Box 452, Gardena, Calif.
Refractory & Insulation Corp., 120 Wall St., New York 5, N. Y.
Refrigeration Appliances, Inc., 917-923 W. Lake St., Chicago, Ill.
Refrigeration Devices Co., 51 E. Centre St., Nutley 10, N. J.
Refrigeration Economics Co., Inc., 1231 Tuscarawas E., Canton 2, O
Refrigeration Engineering Inc., 7250 E. Slauson Ave., Los Angeles 22 Calif.
Rega Mfg. Co., 79 Mt. Hope Ave., Rochester 20, N. Y.
Register & Grille Mfg. Co., Inc., 70 Berry St., Brooklyn 11, N. Y.
Reichert Float & Mfg. Co., 2238 Smead Ave., Toledo 6, O.
Reif-Rexoil, Inc., 37-41 Carroll St., Buffalo 3, N. Y.
Reilly Tar & Chemical Corp., 1615 Merchants Bank Bldg., Indianapolis 4, Ind.
Reiner & Campbell Co., Inc., 19 Euclid Ave., P. O. Box 5035, Newark 5, N. J.
Reintjes Co., Geo. P., 2517-19 Jefferson St., Kansas City, Mo.
Reliable Metal Engineering Co., 4336-4358 S. Knox, Chicago, Ill.
Reliable Perforating Co., 2047 N. Wood St., Chicago, Ill.
Reliable Products Mfg. Co., 123 De Kalb Ave., Brooklyn, N. Y.
Reliance Automatic Lighting Co., 1929 Mead St., Racine, Wis.
Reliance Electric & Engineering Co., 1058 Ivanhoe Rd., Cleveland 10, O.
Reliance Gauge Column Co., 5902 Carnegie Ave., Cleveland 3, O.
Reliance Refrigerating Machine Co., 3401 N. Kedzie Ave., Chicago, Ill.
Remco, Inc., Zelienople, Pa.
Remington Air Conditioning Div., Remington Corp., Auburn, N. Y.
Remington Arms Co., Inc., Bridgeport, Conn.
Rempe Co., 342 N. Sacramento Blvd., Chicago 12, Ill.
Rensselaer Valve Co., Ontario St., Cohoes, N. Y.
Reps Tool Co., Inc., Box 5, Elmwood Branch, Hartford 10, Conn.
Republic Boiler Corp., 50 W. 50th St., New York, N. Y.
Republic Flow Meters Co., 2240 Diversey Pkwy., Chicago 47, Ill.
Republic Products Co., 7420 State Rd., Philadelphia 36, Pa.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown 1, O.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Republic Steel Corp., Bolt & Nut Div., 1970 Carter Rd., Cleveland 13.
Republic Steel Corp., Steel & Tubes Div., 224 E. 131st St., Cleveland 8, O.
Research Corp., Chrysler Bldg., New York 17, N. Y.
Research Products Corp., 1015 E. Washington Ave., Madison 10, Wis.
Research Vacuum Supply Co., 3434 Montrose Ave., Chicago 18, Ill.
Resisto Pipe & Valve Co., 262 Bridge St., East Cambridge, Mass.
Resistoflex Corp., Belleville 9, N. J.
Reuland Electric Co., 3001 W. Mission Rd., Alhambra, Calif.
Revcor, Carpentersville, Ill.
Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N. Y.
Rex Clay Products Co., 14414 Dexter Blvd., Detroit, Mich.
Rex Welder & Engineering Co., 409 Southwest Blvd., Kansas City 8, Mo.
Reynolds Electric Co., 3000 River Rd., River Grove, Ill.
Reynolds Mfg. Co., The, Box 333, Comstock Park, Mich.
Reynolds Mfg. Co., Inc., Springfield, Mo.
Reynolds Metals Co., 2000 S. 9th St., Louisville 1, Ky.
Reynolds Shaffer Co., Detroit 4, Mich.
Reznor Mfg. Co., Mercer 8, Pa.
Rheem Mfg. Co., 570 Lexington Ave., New York 22, N. Y.
Rhoads & Sons, J. E., 35 N. Sixth St., Philadelphia 6, Pa.
Rhode Island Fittings Co., 355 Dexter St., Providence 7, R. I.
Rhode Island Humidifier & Ventilating Co., 99 Chauncy St., Boston 11, Mass.
Rhodes, Inc., M. H., 30 Bartholomew Ave., Hartford, Conn.
Rich Fan Mfg. Co., Inc., Phil, 2900 Caroline St., Houston 4, Tex.
Richland Co., 100 W. 4th St., Mansfield, O.
Richmond Engineering Co., Inc., 7th and Hospital Sts., Richmond, Va.
Richmond Radiator Co., Box 111, Metuchen, N. J.
Richmont, Inc., 922 S. Myrtle Ave., Monrovia, Calif.
Ric-wiL Co., The, Barberton, O.
Ridge Tool Co., Clark St., Elyria, O.
Rid-Sludge Div., Aulwood Mfg. Co., 77 Raymond Ave., St. Paul, Minn.
Riggin Metal Products, Inc., Box 267, Kankakee, Ill.
Riggio Co., Frank D., 38 Orient Way, Rutherford, N. J.
Rigidbilt Inc., 2850 W. Fulton St., Chicago 12, Ill.
Rigidized Metals Corp., 721 Ohio St., Buffalo 3, N. Y.
Riley Stoker Corp., 9 Neponset St., Worcester, Mass.
Rinehart Inc., 511-513 Main St., Richmond, Ind.
Ripley Co., Inc., Middletown, Conn.
Ripley Co., Inc., L-R Blower Div., Middletown, Conn.
Rite Engineering & Mfg. Corp., 144 S. Mission Rd., Los Angeles, Calif.
Ritter Pattern & Casting Co., Inc., 232 Canal St., New York 13, N. Y.
Rittling Corp., The, Rand Bldg., Buffalo 3, N. Y.
Robbins & Myers, Inc., 1345 Lagonda Ave., Springfield, O.
Robbins & Myers, Inc., Fan Div., 387 S. Front St., Memphis, Tenn.
Roberson Co., L. N., 1539 E. 103rd St., Seattle 55, Wash.
Robert Mfg. Co., 9035 Venice Blvd., Los Angeles 34, Calif.
Roberts-Gordon Appliance Corp., 44 Central Ave., Buffalo 6, N. Y.
Roberts Tube Works, 2500 Military Ave., Detroit 9, Mich.
Robertson Co., H. H., 2400 Farmers Bank Bldg., Pittsburgh 22, Pa
Robinson Aviation, Inc., Teterboro Air Terminal, Teterboro, N. J.
Robinson Clay Product Co., The, 65 W. State St., Akron 9, O.
Robinson Corp., 120 Valley Rd., Roselle Park, N. J.
Robinson Industries, Coleman, Mich.
Robinson Ventilating Co., Zelionople, Pa.
Robvon Backing Ring Co., 675 Garden St., Elizabeth 2, N. J.
Rochester Lead Works, Inc., 380 Exchange St., Rochester 8, N. Y.
Rochester Mfg. Co., Inc., 63 Rockwood St., Rochester 10, N. Y.
Rochester Products, Div. of General Motors Corp., Rochester, N. Y.
Rock Island Register Co., 2435 Fifth Ave., Rock Island, Ill.
Rockford Screw Products Co., 2501 Ninth St., Rockford, Ill.
Rockwell Co., W. S., 2543 Eliot St., Fairfield, Conn.
Rockwell Mfg. Co., Meter & Valve Div., 400 N. Lexington Ave., Pittsburgh 8, Pa.
Rockwood Sprinkler Co., 38 Harlow St., Worcester 5, Mass.
Roddick Tool Co., P. O. Box 109, Anaheim, Calif.
Rodwell Engineering & Sales Co., 4303 Dodge St., Omaha, Neb.
Roessing Mfg. Co., 1616 Noble St., Sharpsburg, Pittsburgh 15, Pa.
Roller Bearing Co. of America, Sullivan Way, West Trenton, N. J.
Rome-Turney Radiator Co., Canal St., Rome, N. Y.
Ronor Corp., 1360 W. 9th St., Cleveland 13, O.
Roots-Connersville Blower Div., 900 W. Mount St., Connersville, Ind.
Roper Corp., Geo. D., Blackhawk Park Ave., Rockford, Ill.
Rosebraugh Co., W. W., 680 S. 17th St., Salem, Ore.
Rosedale Foundry & Machine Co., Columbus & Preble Aves., N. S., Pittsburgh, Pa.
Ross Engineering Corp., J. O., 444 Madison Ave., New York 22, N. Y.
Ross Sprinkler Co., 34 Roberts St., Pasadena 3, Calif.
Ross Valve Mfg. Co., Inc., 6 Oakwood Ave., Troy, N. Y.
Rotary Concrete Drill Co., 650 S. Arroyo Pkwy., Pasadena, Calif.
Rotary Seal Co., 2020 N. Larrabee St., Chicago 14, Ill.
Roth Co., Roy E., 2420-A 24th Ave., Rock Island, Ill.
Rotometals, 980 Harrison St., San Francisco 7, Calif.
Rotor Tool Co., 26300 Lakeland Blvd., Cleveland 23, O.
Royal Jet, Inc., 1024 Westminster Ave., Alhambra, Calif.
Royal Mfg. Corp., Waterloo, Ind.

Royal Ventilator Co., 415 Locust St., Philadelphia 6, Pa.
Royalton Co., Inc., Gasport, N. Y.
Royersford Foundry & Machine Co., Inc., 101-131 Main St., Royersford, Pa.
Roylyn, Inc., 1706 Standard Ave., Glendale 1, Calif.
Rubatex Div., Great American Industries, Inc., Bedford, Va.
Rubber & Plastics Compound Co., Rockefeller Plaza, New York, N. Y.
Ruberoid Co., 500 Fifth Ave., New York 18, N. Y.
Ruby Chemical Co., 74 McDowell St., Columbus 8, O.
Ruemelin Mfg. Co., 3860 N. Palmer St., Milwaukee 12, Wis.
Ruggles-Klingemann Mfg. Co., 110 Tremont St., Boston, Mass.
Rupp right, Siegfried, Box 6795, Los Angeles 22, Calif.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Russell Co., F. C., The, 1100 Chester Ave., Cleveland 1, O.
Russell Mfg. Co., John M., Div. of Risdon Mfg. Co., 852 Rubber Ave., Naugatuck, Conn.
Rust-Oleum Corp., 2425 Oakton St., Evanston, Ill.
Ruthman Machinery Co., 1809 Reading Rd., Cincinnati, O.
Rutland Fire Clay Co., Curtis Ave., Rutland, Vt.
Ruud Mfg. Co., 2934 Smallman St., Pittsburgh 1, Pa.

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SKF Industries, Inc., Front St., & Erie Ave., Philadelphia 32, Pa.
S.O.S. Products Co., Inc., 282 Nassau Ave., Brooklyn 22, N. Y.
Sac Tool Mfg. Co., 1913 Washington Ave., St. Louis 3, Mo.
St. Clair Rubber Co., 440 E. Jefferson, Detroit, Mich.
St. Louis Blow Pipe & Heater Co., Div. of Young Sales Corp., 1948 N. 9th St., St. Louis 6.
St. Louis Tool Co., 6100 Prescott St., St. Louis 15, Mo.
St. Paul Corrugating Co., S. Wabasha and Water Sts., St. Paul 1.
Sales & Co., Murray W., 801 W. Baltimore Ave., Detroit 2, Mich.
Salina Metal Products Co., 9th and Bishop, Salina, Kan.
Sall Bros. Co., 2320 Kishwaukee St., Rockford, Ill.
Sall Mountain Co., Box 777, Hamilton, O.
Salsbury Corp., 1161 E. Florence Ave., Los Angeles 1. Calif.
San Angelo Foundry & Machine Co., P. O. Box 43, Mt. Vernon, Ill.
Sandee Mfg. Co., 5050 W. Foster Ave., Chicago, Ill.
Sangamo Electric Co., 1301 N. 11th St., Springfield, Ill.
Santa Fe Tank & Tower Co., 5401 S. Boyle Ave., Los Angeles 11.
Santa Fe Tank & Tower Co. of Texas, P. O. Box 278, Garland, Tex.
Saran Lined Pipe Co., 2415 Burdette Ave., Ferndale 20, Mich.
Sarco Co., Inc., Empire State Bldg., New York 1, N. Y.
Sarcotherm Controls, Inc., Empire State Bldg., New York 1, N. Y.
Sauereisen Cements Co., 2308 Main St., Pittsburgh, Pa.
Saunders Mfg. Co., 25 Atherton St., Yonkers, N. Y.
Saverite Engineering Co., 1030 Willow Ave., Hoboken, N. J.
Sawhill Mfg. Co., Sharon, Pa.
Scaico, Inc., Market St., Palmyra, N. J.
Scaife Co., 26 Ann St., Oakmont, Pa.
Schade Valve Mfg. Co., 2527 N. Bodine St., Philadelphia 33, Pa.
Schaible Co., The, 1086 Summer St., Cincinnati 4, O.
Schatz Mfg. Co., The, Fairview, Poughkeepsie, N. Y.
Schaub Engineering Co., Fred H., 2110 S. Marshall Blvd., Chicago 23, Ill.
Schecter Brothers Co., Hancock and Huntingdon Sts., Philadelphia 33, Pa.
Schemenauer Mfg. Corp., Holland, O.
Schieren Co., Chas. A., 30-38 Ferry St., New York 7, N. Y.
Schild Mfg. Co., Lakewood Station, Box 9803, Dallas 2, Tex.
Schmieg Industries, Inc., P. O. Box 4701, Detroit 34, Mich.
Schnacke, Inc., 1101 N. Governor St., Evansville, Ind.
Schneible Co., Claude B., P. O. Box 81 No. end Station, Detroit 2.
Schoedinger, F. O., 322-358 Mt. Vernon Ave., Columbus 16, O.
Schramm, Inc., West Chester, Pa.
Schror, Dr. Adolph, 52 Cambridge St., East Orange, N. J.
Schundler & Co., Inc., F. E., 45-15 Vernon Blvd., Long Island City, N. Y.
Schurs Oil Burner Co., 8500 Zamore Ave., Los Angeles 1, Calif.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Schwitzer-Cummins Co., 1125 Massachusetts Ave., Indianapolis 7, Ind.
Sciaky Bros. Inc., 4915 W. 67th St., Chicago 38, Ill.
Scientiae Tool Co., 103 Pine, Dayton 2, O.
Scientific Instrument Co., 1041 Second Ave., Detroit 26, Mich.
Scott Valve Mfg. Co., 3963 McKinley Ave., Detroit 8, Mich.
Scovill Mfg. Co., Waterville Div., Waterville 14, Conn.
Screw Machine Products Co., P. O. Box 7497, Portland 20, Ore.
Scully Signal Co., 88 First St., Cambridge 41, Mass.
Sealed Power Corp., 500 Sanford St., Muskegon 61, Mich.
Sealed Unit Parts Co., Inc., 261 E. 161st St., Bronx 51, N. Y.
Sealol Corp., 45 Willard Ave., Providence 5, R. I.
Seamless Rubber Co., The, F.O.S. Industrial Tape Div., 464 Congress Ave., New Haven 3, Conn.
Seamlex Co., Inc., 41-23 24th St., Long Island City 1, N. Y.
Selas Corp. of America, Erie Ave. and D St., Philadelphia 34, Pa.
SelecTemp Div., Iron Fireman Mfg. Co., 3170 W. 106th St., Cleveland 11, O.
Sellers Engineering Co., 4874-76 N. Clark St., Chicago 40, Ill.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.
Servel, Inc., 119 Morton Ave., Evansville 20, Ind.
Service To Industry, Box 133, West Hartford, Conn.
Shafer Bearing, Div. of Chain Belt Co., 801 Burlington Ave., Downers Grove, Ill.
Shakeproof Div., Illinois Tool Wks., St. Charles Rd., Elgin, Ill.
Shallcross Co., 48th and Grays Ferry Rd., Philadelphia 43, Pa.
Shallcross Controls, Inc., 2217-21 N. 31st St., Milwaukee 8, Wis.
Shank Co., Cyrus, 4646 W. 12th Pl., Cicero, Ill.
Sharon Steel Corp., Sharon, Pa.
Shaw Co., Benjamin F., Second & Lombard Sts., Wilmington 99, Del.
Shaw-Kendall Engineering Co., 128 S. Superior St., Toledo 4, O.
Shaw-Perkins Mfg. Co., 201 E. Carson St., Pittsburgh 19, Pa.
Sheffler-Gross Co., Drexel Bldg., Philadelphia 6, Pa.
Sheldon Equipment Co., E. H., 716 Nims St., Muskegon, Mich.
Shell Oil Co., Lubricants Dept., 50 W. 50th St., New York 20, N. Y.
Shenango Agaloy Tube Co., Agaloy Tubing Div., 905 Wheel St., Springfield, O.
Shephard Heater Co., Inc., 951 Sycamore St., Terre Haute, Ind.
Sherwin-Williams Co., The, 101 Prospect Ave., N. W., Cleveland, O.
Sherwood Water Treatment Co., Inc., Beverly, N. J.
Siemon Mfg. Co., 1817-19 Holmes St., Kansas City 8, Mo.
Sier Bath Gear & Pump Co., Inc., North Bergen, N. J.
Sight Feed Generator Co., P. O. Box 38, West Alexandria, O.
Signal Electric Mfg. Co., Menominee, Mich.
Signal Indicator Co., 42 Stewart Ave., Brooklyn 37, N. Y.
Sikes Co., S. R., 1028 S. Third St., Minneapolis 15, Minn.
Silco Products, Inc., 1330 Quincy St., N.E., Minneapolis, Minn.
Silvercote Products, Inc., 161 E. Erie St., Chicago 11, Ill.
Simplex Ceiling Corp., 552 W. 52nd St., New York 19, N. Y.
Simplex Heating Specialty Co., Inc., 954 Cabell St., Lynchburg, Va.
Simplex Mfg. Co., 198 N. Main St., Fond du Lac, Wis.
Simplex Oil Heating Corp., 7901 Oxford, Philadelphia 11, Pa.
Simplex Valve & Meter Co., 68th and Upland Sts., Philadelphia 42, Pa.
Sims Co., 18th & Whitley Sts., Erie, Pa.
Sinker-Davis Co., 230 S. Missouri St., Indianapolis 4, Ind.
Sioux Steel Co., P. O. Box 898, Sioux Falls, S. D.
Sipe & Co., James B., Box 8010, Pittsburgh 16, Pa.
Skidmore Corp., St. Joseph, Mich.
Skilbeck Mfg. Co., 7432 27th Ave., Kenosha, Wis.
Skil Corp., 5033 Elston Ave., Chicago 30, Ill.
Skinner Co., M. B., South Bend 21, Ind.
Skinner Electric Valve Div., Edgewood Ave., New Britain, Conn.
Skinner Engine Co., 337 W. 12th St., Erie, Pa.
Skinner Irrigation Co., 121 E. Canal St., Troy, O.
Skyline Industries, Titusville, Pa.
Slant-Fin Radiator Corp., 5113-17 2nd Ave., Brooklyn, N. Y.
Sly Mfg. Co., W. W., 4700 Train Ave., Cleveland 2, O.
Small Motors, Inc., 2076 Elston Ave., Chicago 14, Ill.
Smith Bros. Co., 414 S. Harvey, Oak Park, Ill.
Smith Co., Inc., H. B., The, 64 Main St., Westfield, Mass.
Smith Co., J. B., 3327 B St., Philadelphia 34, Pa.
Smith Co., S. Morgan, Lincoln & Hartley Sts., York, Pa.
Smith Control & Instrument Corp., Palmyra, N. J.
Smith Corp., A. O., 3533 N. 27th St., Milwaukee 1, Wis.
Smith Corp., A. O., Eastern Motor Div., 1000 Webster St., Dayton 4, O.
Smith Filter Corp., 1603-2 Ave., Moline, Ill.
Smith & Kanzler Corp., E. Linden Ave., Linden, N. J.
Smith Products Co., 14940 Washburn, Detroit, Mich.
Smith-Raymond Co., 1231-33 Tenth Ave., Columbus, Ga.
Smith & Serrell, Inc., 200 Washington St., Newark 2, N. J.
Smith Twin Tubular Boiler Co., Inc., Cottman St., at State Rd., Philadelphia 35, Pa.
Smith Welding Equipment Corp., 2633 S. E. Fourth St., Minneapolis 14, Minn.
Smolensky Valve Co., Inc., 940 Broadway, Bedford, O.
Smooth-On Mfg. Co., 568-574 Communipaw Ave., Jersey City 4, N. J.
Snap-on Tools Corp., Kenosha, Wis.
Snap-Tite, Inc., Union City, Pa.
Socony-Vacuum Oil Co., Inc., 26 Broadway, New York 4, N. Y.
Sola Electric Co., 4633 W. 16th St., Chicago 50, Ill.
Soldering Specialties Co., Summit, N. J.
Solon Mfg. Co., Solon, O.
Solar Aircraft Co., 2200 Pacific Highway, San Diego 12, Calif.
Solvay Process Div., Allied Chemical & Dye Corp., 61 Broadway, New York 6, N. Y.
Somers, Inc., H. J., 6063 Wabash Ave., Detroit 8, Mich.
Somerville Iron Wks., Somerville, N. J.
Sommerfield, Inc., Lou, 234 E. 128th St., New York, N. Y.
Sonneborn Sons, Inc., L., 404 Fourth Ave., New York 16, N. Y.
Sonner Burner Co., 412-420 E. 6th Ave., Winfield, Kans.
Sonoco Products Co., Hartsville, S.C.
Soreng Products Corp., 9555 Soreng Ave., Schiller Park, Ill.
South Bend Air Products, Inc., 322 E. Colfax Ave., South Bend 22, Ind.
South Chester Corp., Southco Div., Lester, Pa.
South Chester Tube Co., Front & Thurlow Sts., P. O. Box 60, Chester, Pa.
Souther Iron Co., E. E., 1952 Kienlen Ave., St. Louis 20, Mo.
Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga.
Spang-Chalfant, Div. of National Supply Co., P. O. Box 416, Pittsburgh 30, Pa.
Sparkler Mfg. Co., Mundelein, Ill.
Spartan Tool Co., 1918 Columbia Ave., Chicago 26, Ill.
Speakman Co., Riverview Wks., Wilmington 99, Del.
Special Chemicals Corp., 30 Irving Pl., New York 3, N. Y.
Speed Selector Inc., 118 Noble Court, Cleveland 13, O.
Speedway Mfg. Co., 1834 S. 52nd Ave., Chicago (Cicero), Ill.
Spence Engineering Co., Inc., 32 Grant St., Walden, N. Y.
Spencer Heater, Lycoming Div., Avco Mfg. Corp., 164 Park St., Williamsport, Pa.
Spencer Thermostat Div., Metals & Controls Corp., 34 Forest St., Attleboro, Mass.
Spencer Turbine Co., 486 New Park Ave., Hartford 6, Conn.
Sperti, Inc., 1077 Celestial, Cincinnati, O.
Sponge Rubber Products Co., The, Shelton, Conn.
Sporlan Valve Co., 7525 Sussex Ave., St. Louis 17, Mo.
Spray Engineering Co., 114 Central St., Somerville 45, Mass.

Spraying Systems Co., 3219 Randolph St., Bellwood, Ill.
Sprayo-Flake Co., 2715 Irving Park Blvd., Chicago 18, Ill.
Spring Packing Corp., 332 S. Michigan Ave., Chicago, Ill.
Springfield Boiler Co., 1939 E. Capitol Ave., Springfield, Ill.
Springload Mfg. Corp., 1412 Aurora, Seattle, Wash.
Sprout-Waldron & Co., Muncy, Pa.
Spurgeon Co., 23501 Hoover Rd., Van Dyke, Mich.
Square D Co., 6060 Rivard St., Detroit 11, Mich.
Square D Co., Industrial Controller Div., 4041 N. Richards St., Milwaukee 12, Wis.
Squires Co., C. E., The, 18502 Syracuse Ave., Cleveland 10, O.
Staffco Engrg. Corp., 6600 S. Austin Ave., Chicago 38, Ill.
Stamco Inc., New Bremen, O.
Stanat Mfg. Co., 47-28 37th St., Long Island City 1, N. Y.
Standard Asbestos Mfg. Co., 860 W. Evergreen Ave., Chicago 22, Ill.
Standard Electric Mfg. Co., West Berlin, N. J.
Standard Engineering Wks., 289 Roosevelt Ave., Pawtucket, R. I.
Standard Fuel Engineering Co., 667 Post Ave., S., Detroit 17, Mich.
Standard Machine & Mfg. Co., 8213-15 Gravois Ave., St. Louis 23, Mo.
Standard Oil Co. of California, Bldg. 605, West Olympic Blvd., Los Angeles, Calif.
Standard Oil Co. of Indiana, 910 S. Michigan Ave., Chicago, Ill.
Standard Pressed Steel Co., Box 810, Jenkintown, Pa.
Standard Refrigeration Co., 332 S. Hoyne Ave., Chicago 12, Ill.
Standard Reseater Corp., 423 W. 126th St., New York 27, N. Y.
Standard Rolling Mills, Inc., 196 Diamond St., Brooklyn 22, N. Y.
Standard Stamping & Perforating Co., 3151 W. 49th Pl., Chicago 32, Ill.
Standard Transmission Equipment Co., 78 W. Union St., Pasadena 1, Calif.
Standard Tube Co., 24400 Plymouth Rd., Detroit 28, Mich.
Standard Ventilator Co., Lewisburg, Pa.
Stanley Electric Tools, Div. of The Stanley Works, Myrtle St., New Britain, Conn.
Stanley Works, The, 195 Lake St., New Britain, Conn.
Staples & Pfeiffer, 528 Bryant St., San Francisco 7, Calif.
Star Expansion Bolt Co., 147 Cedar St., New York 6, N. Y.
Star-Kimble Motor Div., Miehle Printing Press & Mfg. Co., 200 Bloomfield Ave., Bloomfield, N. J.
Star Stainless Screw Co., 190-A Union Ave., Paterson 2, N. J.
Star Tubular Products Co., 4747 S. Richmond St., Chicago, Ill.
Steam Turbine Div., Worthington Pump & Machinery Corp., Wellsville, N. Y.
Stedco Products, 71 Lehigh St., Wilkes-Barre, Pa.
Steel City Electric Co., 1201 Columbus Ave., Pittsburgh, Pa.
Steelcote Mfg. Co., 3418 Gratiot St., St. Louis, Mo.
Steel Improvement & Forge Co., 974 E. 64th St., Cleveland 14, O.
Steel Products Engineering Co., The, 1205 W. Columbia St., Springfield, O.
Steinen Mfg. Co., Wm., 43 Bruen St., Newark, N. J.
Stephens-Adamson Mfg. Co., 47 Ridgeway Ave., Aurora, Ill.
Sterling Air Conditioning Corp., 2222 S. Blvd., Charlotte, N. C.
Sterling Electric Motors, Inc., 5401 Telegraph Rd., Los Angeles 22, Calif.
Sterling Engineering & Mfg. Corp., 114 Business St., Hyde Park 36, Mass.
Sterling Heat Specialties Inc., 260 N. Elm St., Westfield, Mass.
Sterling, Inc., 3744 N. Holton St., Milwaukee 12, Wis.
Sterling Radiator Co., Inc., 260 N. Elm St., Westfield, Mass.
Sterns-Flinn Corp., 30 Church St., New York 7, N. Y.
Stevens Mfg. Co., Inc., Mansfield, O.
Stewart Ice Machine Co., 1282 W. 1st St., Pomona, Calif.
Stewart Mfg. Co., Inc., Grove Ave., Cedar Grove, N. J.
Stewart-Warner Corp., South Wind Div., 1514 Drover St., Indianapolis, Ind.
Stickle Steam Specialties Co., 2215 Valley Ave., Indianapolis 1, Ind
Stic-Klip Mfg. Co., Inc., 50 Regent St., Cambridge 40, Mass.
Stillwater Clay Products Co., The, 3334 Prospect Ave., Cleveland 15
Stockham Valves & Fittings Co., Box 2592, Birmingham 2, Ala.
Stokes Machine Co., F. J., 5910 Tabor Rd., Philadelphia 20, Pa.
Stokes Molded Products, Inc., Taylor & Webster, Trenton 4, N. J.
Stout & Sons, David, 7016 Manchester Blvd., St. Louis 17, Mo.
Stover Water Softener Co., 10 State St., St. Charles, Ill.
Stow Mfg. Co., 445 State St., Binghamton, N. Y.
Strahman Valves, Inc., 16-22 Hudson St., New York 13, N. Y.
Straight Line Foundry & Machine Corp., Direct Separator Div., The, 218 S. Geddes St., Syracuse 4, N. Y.
Strandwitz & Co., Inc., W. J., Jefferson and Master Sts., Camden, N. J.
Stratford Pipe Scalloper Co., 1001 Magnolia Dr., Clearwater, Fla.
Strong, Carlisle & Hammond Company, 1392 W. Third St., Cleveland 13, O.
Struthers-Dunn, Inc., 150 N. 13th St., Philadelphia 7, Pa.
Struthers Wells Corp., Titusville, Pa.
Stuart Supply, 417 Ninth St., Des Moines 9, Iowa.
Sturtevant Co., P. A., Addison, Ill.
Sub-Zero Products Co., 3928 Reading Rd., Cincinnati 29, Ohio
Sudbury Laboratory, South Sudbury, Mass.
Sulflo, Inc., 1143 E. Jersey St., Elizabeth 4, N. J.
Sullivan Valve & Engineering Co., 1400 E. Second St., Butte, Mont.
Sumo Pumps, Inc., 375 Fairfield Ave., Stamford, Conn.
Sundstrand Machine Tool Co., 2531 11th St., Rockford, Ill.
Sun-Fire Stoker Corp., New Albany, Ind.
Sun Oil Co., 1608 Walnut St., Philadelphia 3, Pa.
Sun-Ray Burner Mfg. Corp., 139-24 Queens Blvd., Jamaica 2, N. Y.
Super-Cold Corp., 1020 E. 59th St., Los Angeles, Calif.
Super Radiator Corp., 6714 Walker St., St. Louis Park, Minneapolis 16, Minn.
Superior Clay Corp., The, Ulrichsville, O.
Superior Combustion Industries, Inc., Times Tower, Times Sq., New York 36, N. Y.
Superior Controls Co., Inc., 1835 South Bonnie Brae, Los Angeles 6, Calif.
Superior Steel Corp., Grant Bldg., Pittsburgh 19, Pa.
Superior Tube Co., Norristown, Pa.
Superior Valve and Fittings Co., 1509 W. Liberty Ave., Pittsburgh 26, Pa.
Supreme Electric Products Corp., 194 Vassar St., Rochester 7, N. Y.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Sutton Corp., O. A., The, 1812 W. Second St., Wichita 2, Kan.
Swaby Mfg. Co., 3818 W. Armitage Ave., Chicago 47, Ill.
Swaine Mfg. Co., Fred J., 1300 N. Seventh St., St. Louis 6, Mo.
Swallow Airplane Co., Wichita, Kan.
Swartwout Co., The, 18511 Euclid Ave., Cleveland 12, O.
Swift & Co., Adhesive Products Dept., 4115 S. Packers Ave., Chicago 9, Ill.
Swift Lubricator Co., Inc., 19 James Bldg., Elmira, N. Y.
Swift Mfg. Co., Inc., 1455 E. Nine Mile Rd., Hazel Park, Mich.
Synchronous Flame, Inc., 327 S. La Salle St., Chicago, Ill.
Synchro-Start Products, Inc., 8151 N. Ridgeway Ave., Skokie, Ill.
Syncromatic Corp., Watertown, Wis.
Syntron Co., Homer City, Pa.

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T & H Engineering Co., 399 Main St., Little Ferry, N. J.
Taber Pump Co., 272 Elm St., Buffalo 3, N. Y.
Taco Heaters, Inc., 137 South St., Providence, R. I.
Tal Bender, Inc., 417 N. Water St., Milwaukee 2, Wis.
Taller & Cooper, Inc., 75 Front St., Brooklyn 1, N. Y.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., 1001 York St., Indianapolis 7, Ind.
Talon Tools, Inc., North Arlington, N. J.
Tamms Industries, Inc., 228 N. LaSalle St., Chicago 1, Ill.
Tapecoat Co., The, 1523 Lyons St., Evanston, Ill.
Taylor Co., Halsey W., 1259 N. Park Ave., Warren, O.
Taylor Forge & Pipe Wks., P. O. Box 485, Chicago 90, Ill.
Taylor Instrument Companies, 95 Ames St., Rochester 1, N. Y.
Taylor Sons Co., Charles, 710 Burns St., Cincinnati 14, O.
Taylor-Winfield Corp., 1052 Mahoning Ave., N. W., Warren, O.
Technical Ply-Woods, 228 N. LaSalle St., Chicago 1, Ill.
Technical Products Co., 1240 N. Canal, Sharpsburg, Pa.
Techniflex Corp., Port Jervis, N. Y.
Tectum Corp., 105 S. 6th St., Newark, O.
Tecumseh Products Co., Tecumseh, Mich.
Tele King Corp., 601 W. 26th St., New York, N. Y.
Telechron Dept., General Electric Co., Homer Ave., Ashland, Mass.
Telsit Insulation Co., 1933 West Farms Rd., Bronx 60, N. Y.
Templeton Bros., 177 Reservation Rd., Hyde Park 36, Mass.
Tempmaster Corp., 1338 McGee St., Kansas City, Mo.
Tempo Products Co., 2075 E. 65th St., Cleveland, O.
Temprite Products Corp., Dept. HPAC, E. Maple Rd., Birmingham, Mich.
Tennessee Coal & Iron Div., United States Steel Corp., P. O. Box 599, Fairfield, Ala.
Tennessee Products and Chemical Corp., First American National Bank Bldg., Nashville, Tenn.
Tenney Engineering, Inc., 26 Avenue B, Newark 5, N. J.
Termite Drills, Inc., 90 N. Lotus Ave., Pasadena 8, Calif.
Terre Haute Boiler Works Co., 1140 Crawford, Terre Haute, Ind.
Terry Steam Turbine Co., The, P. O. Box 1200, Hartford 1, Conn.
Texas Co., The, 135 E. 42nd St., New York 17, N. Y.
Texas Vitrified Pipe Co., Mineral Wells, Tex.
Texsteam Corp., P. O. Drawer 9127, Houston 11, Tex.
Thermac Co., 800 E. 108th St., Los Angeles, Calif.
Thermapanels, Inc., 795 Kifer Rd., Santa Clara, Calif.
Thermek Sales Co., P. O. Box 268, Whitewater, Wis.
Thermo-Base Div., Gerwin Industries, 214 Spring St., Michigan, Ind.
Therm-O-Disc, Inc., 127 Crouse St., Mansfield, O.
Thermo Instruments Co., 1310 Old County Rd., Belmont, Calif.
ThermoRay Corp., 141 E. 44th St., New York 17, N. Y.
Therm-O-Wheel, Inc., 1040 B-22 St., Far Rockaway 91, N. Y.
Thermoid Co., Trenton, N. J.
Thomas Co., Arthur H., W. Washington Square, Philadelphia, Pa.
Thomas Flexible Coupling, 1938 So. Main St., Warren, Pa.
Thompson and Co., 1085 Allegheny Ave., Oakmont, Pa.
Thompson & Son Co., The Henry G., 277 Chapel St., New Haven, Conn.
Thompson Research & Mfg. Co., Davenport, Fla.
Thomson Electric Welder Co., 161 Pleasant St., Lynn, Mass.
Thomson Industries, Inc., Manhasset, N. Y.
Thor Power Tool Co., 175 N. State St., Aurora, Ill.
Thor Tool & Die Co., 865 Estabrook, San Leandro, Calif.
Thread-Ezy Mfg. Co., Corunna, Mich.
Threadwell Tap & Die Co., Greenfield, Mass.
Three Point Industries, 3767 N. Racine Ave., Chicago 13, Ill.
Thrush & Co., H. A., Peru, Ind.
Thwing-Albert Instrument Co., Penn and Pulaski Ave., Philadelphia 44, Pa.
Tierney Rotor Ventilator Co., 239 Fourth Ave., S., Minneapolis, Minn.
Tiffin Eaves Trough Clamp Co., 25 Miami, Tiffin, O.
Time 'Trol Co., 2 Embassy Court, Great Neck, L. I., N. Y.
Timken Roller Bearing Co., 1835 Dueber Ave., S. W., Canton 6, O.
Timken Silent Automatic Div., Timken-Detroit Axle Co., Jackson, Mich.

Tinnerman Products, Inc., Dept. No. 16, P. O. Box 6688, Cleveland 1, O.
Tippett & Wood, Morris and Warren Sts., Phillipsburg, N. J.
Titchener, E. H. & Co., 67 Clinton St., Binghamton, N. Y.
Titeflex, Inc., 469 Frelinghuysen Ave., Newark 5, N. J.
Titus Mfg. Corp., 113 E. 8th St., Waterloo, Iowa
Titusville Iron Wks. Co., The, Titusville, Pa.
Todd Shipyards Corp., Combustion Equipment Div., 81-16-45th Ave., Elmhurst 73, N. Y.
Toledo Pipe Threading Machine Co., 1445 Summit St., Toledo 4, O.
Torit Mfg. Co., 292 Walnut St., St. Paul 2, Minn.
Tork Clock Co., Inc., 1 Grove St., Mt. Vernon, N. Y.
Torq Electric Mfg. Corp., 1006 Interstate St., Bedford, O.
Torrington Co., The, Bantam Bearings Div., South Bend 21, Ind.
Torrington Mfg Co., 70 Franklin St., Torrington, Conn.
Torrington Mfg. Co., The, Western Div., 15001 Oxnard St., Van Nuys, Calif.
Trade-Wind Motorfans, Inc., 5725 S. Main St., Los Angeles 37, Calif.
Trane Co., The, La Crosse, Wis.
Trent, Inc., Leverington Ave. and Wilde St., Philadelphia 27, Pa.
Trent Tube Co., 430 Church St., East Troy, Wis.
Trerice Co., H. O., 1420 W. Lafayette Blvd., Detroit 16, Mich.
Triangle Conduit & Cable Co., Inc., Triangle & Jersey Aves., New Brunswick, N. J.
Triangle Mfg. Co., 396 Division St., Oshkosh, Wis.
Tranter Mfg. Inc., Lansing 4, Mich.
Tri-Clover Machine Co., 2809 60th St., Kenosha, Wis.
Trimount Instrument Co., 3119 W. Lake St., Chicago 12, Ill.
Trimount Rotary Power Co., 189 Cedar St., Dedham, Mass.
Trindl Products, Ltd., 17 E. 23rd St., Chicago 16, Ill.
Trinity Equipment Corp., Roselle Park, New Jersey
Trion Inc., 1000 Island Ave., McKees Rocks, Pa.
Tripar Products, Inc., 14641 West Eleven Mile Rd., Royal Oak, Mich.
Triplex Heating Specialty Co., Inc., 252 N. Grant, Peru, Ind.
Trombetta Solenoid Corp., 329 N. Milwaukee St., Milwaukee 2, Wis.
Tropical Paint & Oil Co., 1244-82 W. 70th St., Cleveland 2, O.
Troy Engine & Machine Co., 20 Railroad Ave., Troy, Pa.
Truetite Corp., The, 36 Union Ave., Bridgeport 7, Conn.
Truflo Fan Co., 523 Main St., Harmony, Pa.
Tru-Line Corp., 1725 Clover Field Blvd., Santa Monica, Calif.
Trumbull Components Dept., General Electric Co., Woodford Ave., Plainville, Conn.
Truscon Laboratories, Caniff and Trunk R. R., Detroit 11, Mich.
Truscon Steel Div., Republic Steel Corp., 1315 Albert St., Youngstown 1, O.
Tryco Products, Inc., Railroad Sq., Westfield, Mass.
Tube Reducing Corp., Wallington, N. J.
Tube Turns, Inc., 224 E. Broadway, Louisville 1, Ky.
Tubing Appliance Co., 10321 Anza Ing., Los Angeles, Calif.
Tubing Seal-Cap, Inc., 808 W. Santa Anita, San Gabriel, Calif.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 1, Calif.
Turner Brass Wks., The, 821-47 Park Ave., Sycamore, Ill.
Tuthill Pump Co., 939 E. 95th St., Chicago 19, Ill.
Tuttle & Bailey, Inc., Corbin Ave., New Britain, Conn.
Tweco Products Co., P. O. Box 666, Wichita 1, Kan.
Typhoon Air Conditioning Co., Inc., 794 Union St., Brooklyn 15, N. Y.
Tywel Mfg. Corp., 60 Broadway, Brooklyn, N. Y.

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[Also see "United States"]

U. S. Electric Welder Corp., 1258 Dorr St., Toledo, O.
U. S. Electrical Motors, Inc., 200 E. Slauson Ave., Los Angeles 54
U. S. Electrical Tool Co., 1050 Findlay St., Cincinnati 14, O.
U. S. Expansion Bolt Co., P. O. Box 827, State St. & P.R.R., York Pa.
U. S. Machine Corp., Div. of Stewart-Warner Corp., Lebanon, Ind.
U. S. Pipe & Mfg. Co., East Grand Ave., S. San Francisco, Calif.
U. S. Plug & Fitting Co., Wellington, O.
U. S. Thermo Control Co., 44 S. 12th St., Minneapolis, Minn.
Uehling Instrument Co., 473 Getty Ave., Paterson 3, N. J.
Ultrasonic Corp., 61 Rogers St., Cambridge 42, Mass.
Ultra-Viscoson Corp., The, 1240 Main St., Hartford 3, Conn.
Unexcelled Chemical Corp., Empire State Bldg., New York, N. Y.
Unifilter Co., 29845 W. 13 Mile Rd., Farmington, Mich.
Uniflow Mfg. Co., E. Lake Rd., Erie, Pa.
Unimax Switch Div., W. L. Maxson Corp., 461 W. 34th St., New York 1, N. Y.
Union Asbestos & Rubber Co., 332 S. Michigan Ave., Chicago 4, Ill.
Union Electric & Mfg. Co., 1057 Summit Ave., Jersey City, N. J.
Union Iron Wks., 1500 Cascade St., Erie, Pa.
Union Malleable Mfg. Co., P. O. Box 566, Ashland, O.
Union Metal Wks., 128 Carter St., Chelsea 50, Mass.
Union Pipe Fitting Co., Fort Atkinson, Wis.
Union Steam Pump Co., Capitol Ave., S. W., Battle Creek, Mich.
Union Water Meter Co., 333 Hermon St., Worcester, Mass.
Unistrut Products Co., 1013 W. Washington Blvd., Chicago 7, Ill.
Unit Alarm Co., The, 17 Saratoga Dr., Schenectady, N. Y.
United Chromium, Inc., 100 E. 42nd St., New York 17, N. Y.
United Conditioning Corp., Croton Falls, N. Y.
United Cooling Tower Co., P. O. Box 5959, 4022 Broadway, Kansas City 11, Mo.
United Cork Companies, Central Ave., Kearny, N. J.
United Electric Controls Co., 85 School St., Watertown, Mass.
United Electric Service Co., P. O. Box 119, Wichita Falls, Tex.
United Industries, Box 449, Madison 1, Wis.
United Machinery Sales Co., 2351 N. St. Louis Ave., Chicago 47, Ill.
United Metal Hose Co., Inc., 36-01 43rd Ave., Long Island City 1, N. Y.

[Also see "U. S."]

United States Air Conditioning Corp., 33rd & Como Ave., S. E. Minneapolis 14, Minn.
United States Gasket Co., 602 N. 10th St., Camden, N. J.
United States Gauge Div. of American Machine and Metals, Inc., Sellersville, Pa.
United States Gypsum Co., 300 W. Adams St., Chicago 6, Ill.
United States Mineral Wool Co., Stanhope, N. J.
United States Ozone Co. of America, Crescent St., Scottdale, Pa.
United States Pipe & Foundry Co., Birmingham, Ala.
United States Radiator Corp., 300 Buhl Bldg., Detroit 31, Mich.
United States Register Co., Burnham St., Battle Creek, Mich.
United States Rubber Co., 1230 Ave. of the Americas, New York 20, N. Y.
United States Steel Corp., 525 Wm. Penn Place Bldg., Pittsburgh 30, Pa.
United States Steel Supply Div., United States Steel Corp., 208 S. La Salle St., Chicago 4, Ill.
United States Stoneware Co., 60 E. 42nd St., New York 17, N. Y.
Universal Controls Corp., 731 W. Davis St., Dallas 8, Tex.
Universal Convector Corp., 230 Manida St., New York 59, N. Y.
Universal-Cyclops Steel Corp., Bridgeville, Pa.
Universal Diffuser Corp., 1360 Garrison Ave., New York 59, N. Y.
Universal Gypsum & Lime Co., 111 W. Washington St., Chicago, Ill.
Universal Industrial Propeller Co., Stamford, Conn.
Universal Mfg. Co., 1440 San Pablo Ave., Berkeley 2, Calif.
Universal Sewer Pipe Co., 1500 Union Commerce Bldg., Cleveland, O.
Universal Valve Co., P. O. Box 444H, Elizabeth, N. J.
Universal Welder Corp., 2557 E. 79th St., Cleveland, O.
Uno Ventilator Co., 1236 Eastern Ave., Malden 48, Mass.
Up-Right Scaffolds, 1013 Pardee St., Berkeley 10, Calif.
Utica Products, Inc., Utica 4, N. Y.
Utica Radiator Corp., 2201 Dwyer Ave., Utica 2, N. Y.
Utility Appliance Corp., 4851 S. Alameda St., Los Angeles 58, Calif.
Utility Fan Corp., Div. of Utility Appliance Corp., 911 E. 59th St., Los Angeles 1, Calif.
Utility Laboratory, Inc., 330 36th St., Brooklyn 32, N. Y.

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V. & E. Products, Inc., Schuylkill Haven, Pa.
V-Belt Clutch Co., 418 N. Western Ave., Los Angeles 4, Calif.
Vacuum-Electronic Engineering Co., 86 Denton Ave., New Hyde Park, L. I., N. Y.
Valco, Inc., 1410 West St., Cincinnati 15, O.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vanderman Mfg. Co., Mansfield Ave., Willimantic, Conn.
Van Dorn Iron Wks., 2685 E. 79th St., Cleveland, O.
Van Noorden Co., E., 100 Magazine St., Boston 19, Mass.
Van-Packer Corp., 209 S. La Salle St., Chicago 4, Ill.
Vanton Pump & Equipment Corp., Empire State Bldg., New York 1, N. Y.
Vapofier Corp., 10316 S. Throop St., Chicago 43, Ill.
Vapor Heating Corp., 80 E. Jackson Blvd., Chicago 4, Ill.
Velan Engineering Co., 414 Darby Rd., Havertown, Pa.
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Vernon Tool Co., Ltd., 1109 Meridian Ave., Alhambra, Calif.
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Vibration Eliminator Co., 10-28 47th Ave., Long Island City 1, N. Y
Vickers, Inc., Div. of Sperry Corp., 2160 E. Imperial Highway, El Segundo, Calif.
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Viking Copper Tube Co., 16700 St. Clair Ave., Cleveland 10, O.
Viking Mfg. Corp., 1747 Chester Ave., Cleveland 14, O.
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Viking Shear Co., 1063 W. 19th St., Erie, Pa.
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Visa-Test Sales Co., 1515 Alturas Drive, Burlingame, Calif.
Vogt Machine Co., Henry, 1000 W. Ormsby St., Louisville 10, Ky.
Voss Co., Inc., J. H. H., 785 E. 144th St., Corner of Wales Ave., New York 54, N. Y.
Vulcan Electric Co., 88-90 Holten St., Danvers, Mass.
Vulcan Radiator Co., 26 Francis Ave., Hartford 6, Conn.

W

W. C. Products, Inc., 1748 Berkeley St., Santa Monica, Calif.
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Wade Mfg. Co., Elgin, Ill.
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Walsh Holyoke Boiler Wks. Div., Continental Copper & Steel Industries, Inc., 110 Appleton St., Holyoke, Mass.
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Welsbach Corp., The, Ozone Processes Div., 1500 Walnut St., Philadelphia 2, Pa.
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Wheeling Steel Corp., Wheeling Steel Corp. Bldg., Wheeling, W. Va
White Flomatic Corp., P. O. Box 267, Hoosick Falls, N. Y.
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Whitney Metal Tool Co., 110 Forbes St., Rockford, Ill.
Whiton Machine Co., 190 Howard, New London, Conn.
Whittaker Co., Wm. R., 915 N. Citrus, Los Angeles, Calif.
Whittington Pump & Engineering Corp., 1126 Prospect, Indianapolis 3, Ind.
Whitty Co., Inc., 86 Western Ave., Boston 34, Mass.
Wickes Boiler Co., 502 N. Water St., Saginaw, Mich.
Wickwire Spencer Steel, Div. of Colorado Fuel & Iron Corp., 575 Madison Ave., New York 22, N. Y.
Wiedemann Machine Co., 4272 Wissahickon Ave., Philadelphia 32, Pa.
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Wiggins Oil Tool Co., Inc., E. B., 3424 E. Olympic Blvd., Los Angeles 23, Calif.
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Wilcolator Co., 1001 Newark Ave., Elizabeth B, N. J.
Wilhelm Co., A., 3rd and Bern Sts., Reading, Pa.
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Will Corp., 35 Russell St., Rochester 3, N. Y.
Will-Burt Co., The, Orrville, O.
Williams & Co., J. H., Buffalo 7, N. Y.
Williams Gauge Co., The, 1620 Pennsylvania Ave., N. S., Pittsburgh 12, Pa.
Williams Div., Eureka Williams Corp., 1201 East Bell, Bloomington, Ill.
Williams & Son, I. B., Dover, N. H.
Williams Valve Co., D. T., Div. of The Schaible Co., 1086 Summer St., Cincinnati 4, O.
Williamson Heater Co., 3500 Madison Rd., Cincinnati 9, O.
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Willson Products, Inc., 348 Thorn St., Reading, Pa.
Will-Weld Mfg. Co., Inc., 1523 Marcy St., Omaha 2, Nebr.
Wilmington Plastics, Inc., 810 S. Heald St., Wilmington, Del.
Wilson & Co., Inc., 4100 S. Ashland Ave., Chicago 9, Ill.
Wilson Co., H. A., The, U. S. Route 22, Union, N. J.
Wilson Co., K. R., 215 Main St., Buffalo, N. Y.
Wilson Engineering Corp., 122 S. Michigan Ave., Chicago 3, Ill.
Wilson, Inc., Thomas C., 21-11 44th Ave., Long Island City, N. Y.
Windmaster Corp., P. O. Box 776, Columbus 16, O.
Wind-Way Fan & Ventilator Co., 527 St. Joseph St., New Orleans 12, La.
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Winkler & Sons, Inc., A. E., 2337 N. 31st St., Milwaukee 10, Wis.
Winslow Engineering Co., 4069 Hollis, Oakland 8, Calif.
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Wittenmeier Machinery Co., 850-860 N. Spaulding Ave., Chicago 51, Ill.
Wodack Electric Tool Corp., 4627 W. Huron St., Chicago 44, Ill.
Wolfe Co., Inc., The, Franklin C., 3644 Eastham Drive, Culver City, Calif.
Wolfe-Kote Co., Inc., 1225 North 8th St., Sheboygan, Wis.
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Wood Co., John, Conshohocken, Pa.
Wood Steel Co., Alan, Conshohocken, Pa.
Wood's Sons Co., T. B., 1275 Fifth Ave., Chambersburg, Pa.
Worner Electronic Devices, Rankin, Ill.
Worthington-Gamon Meter Div., Worthington Corp., 296 South St., Newark, N. J.
Worthington Corp., Dunellen, N. J.
Worthington Corp., Harrison & Worthington Sts., Harrison, N. J.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
Wright-Austin Co., 3245 Wight St., Detroit 7, Mich.
Wright Mfg. Co., 4025 N. Ceneral Ave., Phoenix, Ariz.
Wysong & Miles Co., 625 Fulton St., Greensboro, N. C.

X-Y-Z

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X Laboratories, Inc., 25 W. 45th St., New York 36, N. Y.
X-Pando Corp., 43-15 36th St., Long Island City 1, N. Y.
Yale & Towne Mfg. Co., Stamford, Conn.
Yardley Plastics Co., 138 Parsons Ave., Columbus 15, O.
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York Corp., Roosevelt Ave., York, Pa.
York Corrugating Co., Adams St. & W. M. R. R., York, Pa.
York-Shipley, Inc., York, Pa.
Yost Mfg. Co., Meadville, Pa.
Young & Bertke Co., 1004-1014 Hulbert Ave., Cincinnati 14, O.
Young Radiator Co., 709 S. Marquette St., Racine, Wis.
Young Regulator Co., 5209 Euclid Ave., Cleveland 3, O.
Youngstown Sheet & Tube Co., Stambaugh Bldg., Youngstown 1, O.
Youngstown Welding & Engrg., 3714 Oakwood, Youngstown, O.
Yula Water Heaters, Inc., 166 W. 225th St., New York, N. Y.
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Zingheim Co., William C., 5050 Lake St., Chicago 44, Ill.
Zink Co., John, 4401 S. Peoria, Tulsa 5, Okla.
Zone-Heat Regulator Co., Box 188, Garrettsville, O.
Zonolite Co., 135 S. LaSalle St., Chicago 3, Ill.
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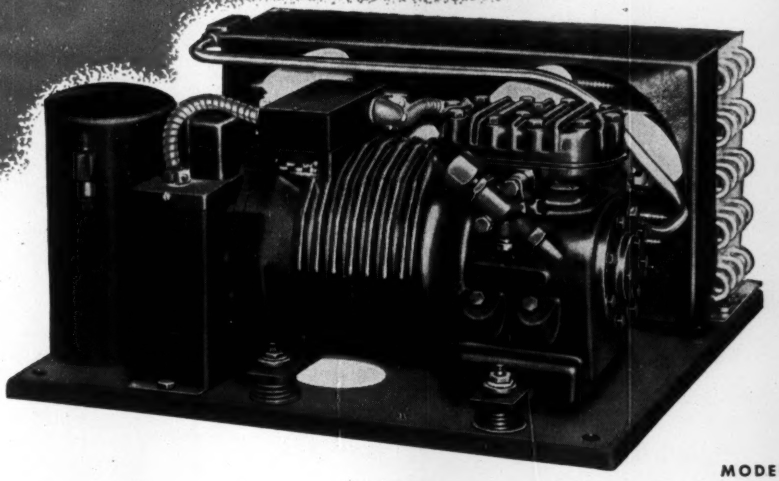

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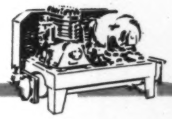

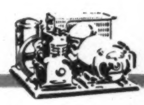

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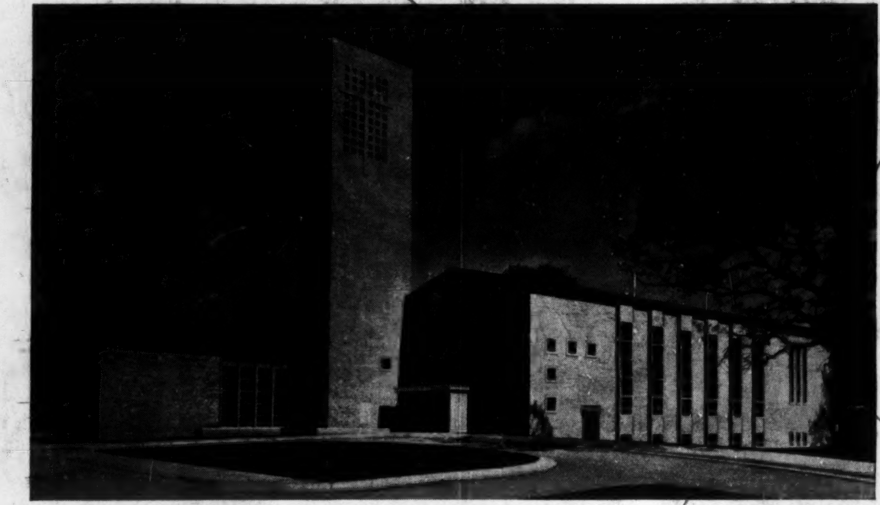

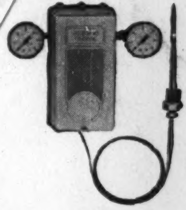

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